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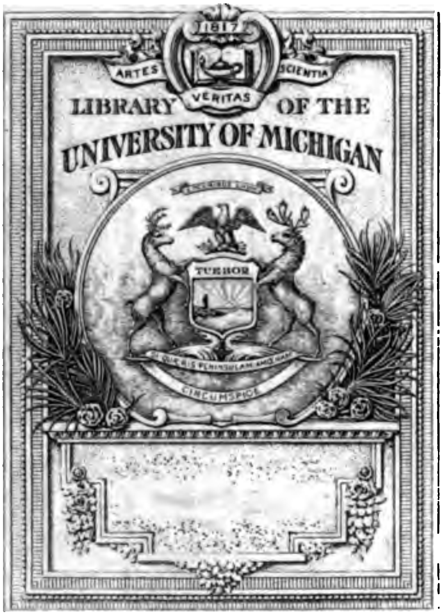
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Department of Archaeology

BULLETIN I

THE
XPLORATION OF JACOBS CAVERN

McDONALD COUNTY, MISSOURI

CHARLES PEABODY AND W. K. MOOREHEAD

1904

NORWOOD, MASS.
PRINTED FOR THE ACADEMY BY
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PREFACE

THE Department of Archaeology of Phillips Academy, Andover, Massachusetts, through the courtesy of the newspapers[1] of the United States, published, in 1902, a circular letter.

The purpose was to direct the attention of those especially who reside in the remoter districts to the importance of finding, preserving, and studying specimens of archaeological value.

The letter was read by Mr. E. H. Jacobs, an archaeologist of Bentonville, Arkansas, whose kindness prompted him to impart to the Department his knowledge of the existence, near Bentonville, of caves, caverns, and rock-shelters affording traces of former human habitation.

He also at the time sent a gift of specimens to the Department from his own collection, and showed an eager interest and a desire to assist in furthering the plans of the Department for excavation. Accordingly, exploration was decided upon, and during April and May, 1903, cursory examinations of several caves and shelters and a more thorough examination of Jacobs Cavern were accomplished.

The Curator of the Department was in this field from April 19 to May 23; the Honorary Director from May 12 to May 23; after their departure the work was carried on under the direction of Mr. Jacobs. All operations ceased on June 1, 1903.

It is with great cordiality that the acknowledgments of the Director and the Curator are paid to Mr. Jacobs for his continued and cheerful assistance in every branch of the work;

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[1] Among others of the *Sun* of Bentonville, Arkansas.

to Mr. Samuel Prater and his family for their hospitality; to Mr. J. H. Foster, the owner of the land, for his free permission to excavate; to Mr. J. L. B. Taylor for his unceasing vigilance at the cavern; to Mr. W. N. Smith for his accurate photographic work and valuable advice in difficult mechanical situations, and to all the men who worked with the explorers for their good nature and perseverance.

Particularly are thanks due to Professor Charles N. Gould of the University of Oklahoma for the gift of his valuable time in spending a week at the Cavern and in preparing a report on its geological features.

The preparation of the present Bulletin has been made easier by the information furnished by Professor W. J. McGee of the Smithsonian Institution of Washington and by the coöperation of Professor Frederick W. Putnam of Harvard University and of Dr. H. C. Hovey of Newburyport, Massachusetts.

It is also a pleasure to speak of the facilities offered by the Peabody Museum and by the Library of the Department of Geology of Harvard University, which have been freely made use of.

The metric system is used throughout the report on Jacobs Cavern.

ANDOVER, MASSACHUSETTS,
January 28, 1904.

I. THE ARCHAEOLOGICAL EXPLORATION OF CAVES, IN GENERAL

In order to determine the importance relative to archaeology of the exploration of Jacobs Cavern, notice should be taken of work done elsewhere of a similar nature.

In Great Britain true palaeolithic man is proved to have existed in many caves.

As an illustration, that one called Robin Hood's Cave[1] may be cited; its situation is near the common boundary of Derbyshire and Nottinghamshire.

A vertical section of the cave is here given, for purposes of demonstration and comparison:

ROBIN HOOD'S CAVE

Vertical Section from Roof to Floor

Stratum	Composition	Thickness	Age	Contents
X	Stalactite (*sic*) uniting roof to floor .	?		
	Dark layer of earth	5″ to 6″	Recent	Pottery Mediaeval Roman
A	Stalagmitic breccia (very hard) . .	0″ to 36″	Pleistocene ?	Bones and implements Imported flint flakes, points, etc.; scrapers
B	Cave earth . . .	21″ to 52″		Bones broken by man Charcoal Flint and quartzite implements
C	Red, clayey sand .	24″ to 48″	Pleistocene	Bones of lion, wild boar, etc., marked by hyenas Quartzite hammers and splinters
D	Light-colored sand, with limestone blocks	24″		No traces of man or wild animals
E	Rocky floor . . .			

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[1] Boyd-Dawkins, *Early Man in Britain*, p. 178.

Here traces of man's occupancy were found in strata 5′ to 9′ in aggregate depth. Remains of palaeolithic man have also been found in Kent's Hole, Devonshire,[1] Wookey Hole, Somersetshire,[1] in the cave of Pont Newydd, St. Asaph, North Wales,[2] and elsewhere.

In France an illustration is furnished by the Grotte de l'Eglise, Dordogne,[3] whose section follows:

GROTTE DE L'EGLISE

Section from Top to Bottom

Stratum	Composition	[illegible]
X	Sheet of stalagmite . . .	
A	Layer of black earth . . .	"Solutrian" Remains of reindeer, horse, and ox Bone awls and points Flint flakes, saws, and scrapers
B	Red earth	"Moustierian" and older Remains of reindeer, cave bear, and horse Chipped implements
C	Yellow sand	Remains of bear and horse "Chipped" and flakes of "jasper"

Remains of cave man have been found in Belgium in the valleys of the Meuse and the Lesse, in Switzerland on the Salève and near Schaffhausen, and on the northern continent as far south as Styria.[5]

Caves in Austria-Hungary are described by Dr. Karl Moser.[6] A general section of one from top to bottom is as follows:[7]

[illegible]

[illegible] Brussels 1872.

[illegible]

Stratum	Thickness	Description	Contents	
A	15 cm.	Earth	Pottery	
B	30 cm.	Ashes	Pottery	
C	15 cm.	Stones	Charcoal Implements	 Bone Stone
D	40 cm.	Red-brown gravel	Flint chips	Palaeolithic
E	40 cm.	Red earth and limestone	Few implements	
F	?	Stalagmites, etc.		

So-called "bone-caves" are found in Moravia.[1]

Cliff-dwellings in France, unknown till recently, have been noted in the Departments of Aveyron and Ardèche and near the Jura Mountains, — all of the neolithic period; others of later date are also known.[2]

In Crete terra-cotta figurines have been taken from the stalagmitic formation in the Dictaean Cave; it does not appear, however, that they have been embedded in the material.[3]

In America reports are at hand from Honduras and Yucatan. G. B. Gordon[4] mentions in "Cave 3, Chamber 2" the remains of fire and burnt bones, under a layer of stalagmite about six inches in thickness. E. H. Thompson,[5] in his researches in Yucatan, found nothing of palaeolithic period, a conclusion also accepted for that country by H. C. Mercer.[6]

Caves in Peru containing human remains are reported,[7] and the "burial caverns" of Alaska have been visited by Dall.[7]

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[1] R. Trampler. *Mittheil. d. Prähist. Comm. der K. Akad. der Wissenschaften*, Vienna, B. 1. 3. 1893.

[2] E.-A. Martel, *La Spéléologie*, Paris, 1900, p. 115.

[3] R. B. Richardson. *The Nation*. June 18, 1903.

[4] *Caverns of Copan*, Mems. Peabody Museum, Vol. I, No. 5, Cambridge, 1898, pp. 7 (143) and 11 (147).

[5] *Cave of Loltun*, Mems. Peabody Museum. Vol. I, No. 2, 1897, p. 22.

[6] "Cave-hunting in Yucatan," *Mass. Inst. Tech. Quarterly*, December, 1897, Vol. X, No. 4, pp. 370 and 355.

[7] Boston *Herald*, January 24, 1904.

In the United States proper widespread efforts have been made, and are at present making, in cave exploration.

H. C. Mercer,[1] in his many investigations, has found nothing truly palaeolithic. O. C. Farrington[2] has examined caves in Indiana, and made observations on the rate of growth of stalagmites. He has visited Wyandotte Cave, Crawford County; Marengo Cave, Crawford County; Shiloh Cave, Lawrence County; Cran's Cave, Monroe County. J. R. Nissley[3] has described a cave in Hancock County, Ohio.

Stalagmitic deposits have been found in Luray Cave, Virginia, and F. W. Putnam[4] has reported on the Mammoth Cave, Kentucky. Stalagmitic deposits are also said to exist near Cavetown, Washington County, Maryland, and in southern California.

The article above mentioned, in the Boston *Herald*,[5] inspired by W. H. Holmes, contains a *résumé* of the previous season's work in American caves. Early human occupation is suggested as possible in the caves of Grand Gulch, Utah; mention is made as well of explorations under the auspices of the Smithsonian Institution, in Indiana, Kentucky, Tennessee, Alabama, Virginia, Maryland, and Pennsylvania.

In addition to the work mentioned, the University of California is at present conducting cave examinations in that state, a work of the utmost detail, under the direction of Professor Frederick W. Putnam.

Completing the list of published work, the following titles represent what has already been published on Jacobs Cavern:

C. N. GOULD: *Science*, July 31, 1903, pp. 151 ff.
E. H. JACOBS: Archaeological Edition of Benton County *Sun*, June 11, 1903.
E. H. JACOBS: Quoted in *American Antiquarian*, September–October, 1903, Vol. XXV, No. 5, pp. 312 ff.

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[1] *Cave Explorations, Eastern United States*. Univ. of Penn. Dept. of Amer. and Prehist. Archaeology, 1894. *Indian House* and *Durham Cave*, Univ. of Penn., as above, Vol. VI, 1897, pp. 147 and 173.

[2] *Observations on Indian Caves*, Field Col. Mus. Public. No. 53, Geol. Series, Vol. I, No. 8, Chicago, February, 1901.

[3] *American Antiquarian*, 1888, Vol. I, p. 43.

[4] Peabody Museum Ann. Rep. No. 8.

[5] January 24, 1904.

C. PEABODY: *American Anthropologist*, New Series, Vol. V, No. 3, July–September, 1903, pp. 579–580.

C. PEABODY: Abstract of paper read at meeting of Archaeological Institute of America, Cleveland, Ohio, December, 1903; in *American Journal of Archaeology*, 2d Series, Vol. VIII, 1904, No. 1, p. 81.

It may be said here that work more detailed and complete has been accomplished in the caves of Europe than in those of America, with the result of proving for the former a very much earlier occupation by man than for the latter. In one respect the continents agree, — in the widespread and not unnatural use of cliff excavations, caves, caverns, and rock-shelters as habitations by primitive man.

II. GEOGRAPHY, ETHNOLOGY, AND HISTORY

Jacobs Cavern is situated on the north bank of Little Sugar Creek, two miles east of Pineville, the county-seat of McDonald County, Missouri.

The County is included in the so-called "Ozark Uplift," or elevated lands extending from near Carbondale, in southern Illinois, southwestward through Missouri and Arkansas to near South McAlester, in the Indian Territory. Some of the heights attain an altitude of seven or eight hundred metres, but in McDonald County much of the land forms a plateau of about three hundred metres altitude, intersected by valleys seventy or eighty metres deep.

The large number of the valleys, the steepness of the slopes, and the beautiful woods upon them, combine with numerous rushing, clear, cold streams to give a charm to the landscape that is a reminder of some parts of New England.

The climate is moderate, rather colder than would be inferred from the latitude, 36° 35′ north; the soil is stony, but somewhat fertile in the river bottoms. Fruit raising is, however, the characteristic agricultural pursuit.

Freshets of violent and widespread destructive power are not infrequent, the creeks and rivers doubling or trebling their depth in a few hours. Such floods add an element of uncertainty to farm work and the chances of success.

Good water and the altitude render the region comparatively healthy.

Jacobs Cavern may be reached by carriage from Pineville, itself accessible by stage from Lanagan, a station 9 km. distant on the Kansas City Southern Railway; or the cavern may be approached by wagon road from Bentonville, Arkansas, 30 km. to the southeast. This city is the county seat of Benton County, Arkansas, on the Bentonville Branch of the St. Louis and San Francisco Railroad. The absence of bridges and the occurrence of the floods above mentioned make communication on occasion uncertain.

Who wêre the first inhabitants of the Ozark region is not known. The historical inhabitants may have been the Kiowas after their migration southward from the Black Hills.

The cavern is included in the district ceded by the Great and Little Osages to the United States on June 2, 1825.[1]

These Osages, of the Siouxan linguistic stock, are further said to have lived on the Osage River, a hundred miles to the north, and on a tributary of the Arkansas River, perhaps somewhat nearer.[2]

Of the early explorers, Coronado, on his expedition to Kansas in 1540, probably passed to the westward of the Ozark Mountains; and there is a tradition that De Soto's men, after his crossing the Mississippi, ascended the White River as far as what is now Benton County, Arkansas.

The first recorded white settlement near the district was that of the French near the mouth of the St. Francis River, in 1670.

A certain Adam Batie was, it is said, the first white man to enter a claim to government land in the neighborhood; this was shortly after 1819, when Arkansas Territory was organized. It lay near Maysville, northwestern Benton County.

In later times the region was in the track of military operations in the war of 1860–65, and the caves were probably of use in the guerilla, warfare characteristic of border sections. A Minié ball was found in the ashes at the rear of Jacobs Cavern. At present the immediate valley is somewhat sparsely inhabited by farmers, of whom a considerable proportion are of northern birth. Negroes are almost entirely absent.

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[1] C. C. Royce, *Indian Land Cessions*, Bur. Eth. Rep. No. 18.

[2] Lewis and Clark, *Journals*, Vol. I, p. 43, Ed. New Amsterdam Book Co., New York, 1902.

III. MINOR CAVERNS AND SITES

The "Ozark Uplift" abounds in recesses and caverns varying from rock-shelters a few metres in depth to true caves with a length of several kilometres.

EDEN BLUFF

Under the guidance of Mr. Jacobs, Mr. Moorehead examined some of the caverns of the White River Valley, Arkansas.

One of them, known as Eden Bluff, is on the north bank of White River, in the western half of Section 34, Township 19 north and Range 29 west, Benton County, Arkansas.

In the bluff proper is a rock-shelter, with an opening about 100 m. in length in the side of the cliff and with a depth inward of perhaps 17 m.; the bluff has altogether a height of nearly 100 m.

The rock-shelter was used in early times for burials, and five or six skeletons have at different times been exhumed; a feature was the "wild hay," dried, found in connection with the burials. This long grass is said to have been abundant on the hills at a time when the country was less heavily wooded. Great damage has been done in the interior by modern searchers after "Spanish gold."

The same condition of affairs exists two kilometres up the White River from Eden Bluff.

A small cavern at this point has been tampered with at different times, and among the earth and stone excavated were many bones of animals, some of them showing the first stages of becoming fossils.

A more detailed examination was undertaken of McElhaney Cavern, situated $\frac{1}{5}$ km. east of Monte Né, Benton County, Arkansas,[1] 8 km. southeast of Rogers. It is on the farm of J. H. McElhaney, in the southeastern quarter of Section 27, Township 19 north, Range 29 west. It faces southwest, and its dimensions are as follows:

Height from floor to roof, at the opening	3 m. 35 cm.
Height from deposits on floor to roof, 6 m. within the cavern .	2 m. 44 cm.
Height from deposits on floor to roof, 8 m. 30 cm. within the cavern	1 m. 52 cm.

Immediately adjoining McElhaney Cavern to the eastward is a small rock-shelter, the floor of which is 2 m. 13 cm. above the present valley level, but whose roof is a prolongation of the stratum of rock forming that of McElhaney Cavern proper.

A deposit of gravel 75 cm. in thickness has been laid down in a cave of which the present small rock-shelter is probably a remnant or successor; water dripping upon this has caused it to become a firmly cemented breccia.

Above the breccia, stalactitic and stalagmitic material filled up much of what was left of space in the cave. The average thickness of the two strata of breccia and of stalactitic material is not far from the same, 75 cm. or more.

Behind these and parallel to them, the small shelter extends for some distance in the form of a cave. The filling in of the small shelter in all likelihood took place before the floor of McElhaney Cavern was established, hence, possibly, the complete absence thus far of evidences in the breccia stratum of human presence.

The floor of the larger (McElhaney) Cavern was found covered with black earth 66 cm. to 1 m. in depth; ashes and débris, abundant near the walls, were intermingled.

There were no stalactites long enough to reach the floor, and no stalagmites.

Animal bones, flint implements, and fragments of pottery were found, not giving evidence of great age.

One fragmentary skeleton was found near the east wall, 40 cm. down.

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[1] Abstract of Report by E. H. Jacobs.

It is probable that the occupation of this cavern was more recent than that of Jacobs Cavern.

The abundance of the village sites in the valleys, and in the terraces of the White River region, is shown by the frequent finding of projectile points, knives, hammer- and rubbing-stones, etc., and points to a long and full inhabiting by man; game and fish are not far to seek, and the soil is of a moderate richness.

Pictographs are found in the neighborhood of Eden Bluff; cosmic symbols, tribal and totemic signs, etc., are in evidence.

IV. GEOLOGY[1]

The hills along Sugar Creek have been caused by the erosion by water of the massive limestone rock.

This limestone contains a large amount of flint or chert, usually in the form of nodular concretions, although sometimes occurring in definite layers. This is the Boone chert of geologists and belongs to the Subcarboniferous Age. The limestone is otherwise known as the Mississippian limestone; it is the rock that covers the greater part of southwestern Missouri, northeastern Indian Territory, and northern Arkansas. The lead and zinc mines of Kansas, Missouri, and Arkansas are in this formation.

In the lower part of the limestone, flint is often absent, and the massive gray rocks are arranged in definite layers, usually from 10 cm. to 50 cm. in thickness.

This part of the formation, known as the St. Joe limestone, is sometimes 20 m. thick, and often is wrought by weathering into characteristic precipitous or overhanging bluffs, extending, it may be, for miles along a stream. The St. Joe limestone is cut at irregular intervals by two series of vertical joints or fissures that divide the rock into rectangular blocks.

The principal series of these joints, which may be termed the master-joints, trend approximately north 35° west, and the other series north 20° east.

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[1] From the complete report of Professor C. N. Gould. Cf. also his article in *Science*, July 31, 1903, p. 151.

The joints may often be distinguished along the face of the cliffs, where they form the division planes between the rock that is still in place and the blocks that have fallen off.

Immediately beneath the limestone is a mass of shales known as the Eureka shales, attaining at times a thickness of 15 m.

The shales, usually black and papyraceous and worn by weather into thin flakes and tablets, are impervious to water, while the limestone and chert just above are more or less porous; thus there arise thousands of springs which issue between the St. Joe limestone and the Eureka shales; at this horizon are the famous Eureka Springs of Arkansas. Also between the limestone and the shale are numerous caves, formed usually by the wearing away of the soft shales beneath the harder medium.

Jacobs Cavern is entirely within the St. Joe limestone, thus differing from the other caves. Immediately above the mouth of the cave the bluff overhangs for about 3 m., and then gradually slopes for 100 m., more or less, to the top of the hill.

The cave is truly a rock-shelter, with floor, roof, and walls of limestone, irregularly V-shaped; it is throughout natural, no marks of human workmanship being visible in the walls or roof.

The flat top is composed of a single stratum of limestone, while along the sides of the cave stratification lines are well exhibited.

The rock floor is covered to a depth of 1 m. with clay, usually a homogeneous mass, yellowish brown, containing fragments of limestone.

Above this was a deposit of ashes. There seems no reason to doubt that the clay is a residual result of the disintegration of the limestone, for, so far as noticed, it has never been disturbed, and the line of separation between it and the ashes above is generally sharply marked. Pits dug in different places showed essentially the same clay structure. Near the bottom of the clay the small limestone fragments are more numerous than above, while at the top they are practically wanting.

At the back of the cave is a fissure, extending upward from the roof to a height of 3 m., separating the roof of the cave from the rear wall. The fissure, probably a master-joint of the series described above, is from ½ m. to less than 1 m. wide, and continues along the back of the cave beyond the main part, forming a narrow recess, which in turn extends for about 5 m.[1]

Along this fissure, and also along the back of the cave where the fissure does not extend, are stalactites, stalagmites, and pilasters, formed by the action of water dropping from the roof. In places the entire fissure above the level of the roof is choked with stalactitic material. The continued dropping of the water carrying $CaCO_3$ in solution upon the ashes covering the floor has formed a sort of stalagmitic ash-breccia, often enclosing fragments of flint or sandstone, flint implements, bones, charcoal, and other material similar to that found buried elsewhere in the ashes.

To the mind of the writer, there is no doubt that the ash-breccia was formed very slowly during and after the deposition of the ashes.

The peculiar toadstool-like shape of some of the pillars, the like of which he has never observed in any other cave, appears to point indisputably to this conclusion. After a careful examination the writer assumes that the following process has taken place: Ashes mingled with bones, flint, and charcoal were deposited upon the floor; then the water dropping from the roof formed the stalagmitic breccia, which spread out in a mass in the shape of a toadstool. Around or upon this stalagmite other ashes and charcoal were deposited, and a second toadstool was formed by the water; in some cases even a third may be seen.

Finally, when the deposition of the ashes ceased, the stalagmite continued to grow until it joined the stalactite from above, forming a pilaster.

Near the back of the cave, particularly underneath the fissure, the greater part of the ashes and some of the clay covering the limestone floor have been cemented by the action of $CaCO_3$, forming ash-, clay-, and limestone-breccia, often very firm and solid. In other parts of the cave both ashes and clay are soft and easily moved.

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[1] "Bone-recess" on the map.

A number of blocks and slabs of limestone were found on the surface of the ashes, or embedded in them or in the clay beneath. They have evidently fallen from the roof, some before man's occupancy, others during it, and still others quite recently.

Of the sandstone fragments and flint flakes in the ash stratum, there seems no doubt that all were carried into the cave from outside. (The possibility of their having entered from above through the fissure at the back is rendered small, first, by their great number, second, by their even distribution throughout the cavern.[1])

The nearest sandstone outcrop on the surface is, so far as could be determined, 6 km. distant, near White Rock, although small sandstone boulders and pebbles are occasionally found on the gravel bars of Sugar Creek.

Whatever the source of supply, man has necessarily brought the sandstone specimens into the cavern.

As to the thousands of flint flakes, varying from small "spalls" to pieces the size of the hand, it was at first thought that they might have fallen from the roof; careful search, however, failed to detect the presence of flint in roof or walls.

Hence (outside of the slight possibility of their having entered by way of the fissure) it is believed that the flakes and implements have all been carried into the cave or produced within it by human agency.

Much of the flint was obtained from the hills near by; but judging from the lithological character of other pieces, it is evident that they have been brought from a distance, some of them, probably, from the flint hills of central Kansas.

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[1] Editors' note.

V. DESCRIPTION OF JACOBS CAVERN

METHODS OF EXCAVATION

Jacobs Cave opens on a hill slope forming the northwestern boundary of the valley of Little Sugar Creek. It is 12 m. in perpendicular distance above the valley floor and a former main channel of the creek.

The opening, like that of most of the caverns of the district that show occupation, is toward the southwest.

The length of the opening from northwest to southeast is 21 m. 20 cm.; the greatest depth inward, measured from southwest to northeast, is 14 m.

The "bone-recess" extends northwestward from the northwestern angle of the cavern for 5 m.

The height of the roof above the undisturbed surface of the ash deposit varied according to the place where measurements were taken.

In front at the eastern end of the opening the height was . .	2 m. 10 cm.
In front at the western end of the opening the height was .	2 m. 60 cm.
Inward 7 m. from the opening at the east side the height was	1 m. 40 cm.
Inward 7 m. from the opening at the west side the height was	1 m. 30 cm.
At the northwest corner in front of the fissure the height was	1 m. 20 cm.

The "bone-recess" varied from 50 cm. to 80 cm. in height.

In the exploration of Jacobs Cavern four things were made the subjects of study: the layer of fine ashes covering the floor, the underlying clay stratum, the stalactites and stalagmites, and the "bone-recess."

The layer or stratum of ashes was from 50 cm. to 1 m. 50 cm. in thickness.

The method of excavation was, first, to divide the surface of the ashes into square metres by rows of stakes, and then to remove the ashes in order, front to back, using the lines of stakes as coördinates to determine the position of any objects found.

The linear distances of 1 m. were numbered from northwest to southeast in Arabic numerals from 1 to 21, and lettered from southwest to northeast from A to Q.

The amount and the contents of the ash stratum will be discussed later. Their character was such as when disturbed during the work seriously to affect the throats and lungs of most of the workmen. Wet sponges tied over the mouth proved effective as preventives against a recurrence of the trouble.

A difficulty during the removal of the ashes was presented by the large blocks of limestone, fallen from the roof since the beginning of the formation of the ash stratum.

Some of them weighed over 1000 kg., and a block and tackle were required for their removal, as well as the services of strong and expert stone-breakers.

The exceedingly irregular presence and the partial clearing away of these blocks interfered greatly with a regularity of excavation, readily adhered to in mounds and sites of homogeneous composition.

The presence of skeletons and of large bones and specimens could, of course, be noted on the first disturbance of the ashes.

For the detection of small implements and fragments of bone, stone, and pottery, men were stationed with hand trowels to examine the ashes as they were placed on the outside slope from the wheelbarrows used in their removal.

To determine the composition of the clay stratum underlying the ashes, pits were sunk through it to the true limestone floor of the cave at metres B/C–9/10, J–10, and G–14.

The same succession and the same composition of strata were observed in all cases. A typical vertical section may be thus shown:

Top to Bottom

1. Stratum A.	*a.*	Ashes	71 cm.
	b.	Ashes with limestone blocks	66 cm.
2. Stratum B.		Clay mixed with limestone fragments	94 cm.
3. True limestone floor.			

A trench at the back of the cavern in front of the row of stalagmites was dug in the clay stratum (B).

From the evidence of the trench and the pits the conclusion was arrived at that no traces of human occupancy were concealed in the clay or lower down than the ash stratum (A).

At the back of the cavern is a row of stalactites, stalagmites, and stalactite-stalagmites.

The following table gives the dimensions and some of the characteristics of the most important of these; most of the measurements were taken by Mr. Jacobs.[1]

No.	Position at Summit Square Metre	Circumference of Base	Height under Original Level of the Ashes	Height above Original Level of the Ashes	Greater Diameter of Base	Notes
		m. cm.	m. cm.	m. cm.	m. cm.	
S.-S. 1	I-18	2 80	1 20	1 00	1 10	With an upper and a lower "stool"
Stal$^{m.}$ 2 . . .	J-17/18		0 70	0 30	0 70	50 cm. below a corresponding stalactite
S.-S. 3 Lower "stool"	K-16	2 50	0 80	0 00	0 93	
S.-S. 3 Upper "stool"	K-16		0 40	0 40	0 60	
Stal$^{m.}$ 4 . . .	K-14	4 70	0 80	0 00	1 50	Entirely below ash-level. The summit is 1 m. 25 cm. below a corresponding stalactite
Stal$^{m.}$ 5 . . .	L-11	6 30	0 70	0 00	2 20	Entirely below ash-level. The summit is 1 m. 20 cm. below a corresponding stalactite
Stal$^{m.}$ 6 . . .	L/M-9/10	4 70	0 55	0 00	1 70	Entirely below ash-level. The summit is 1 m. 30 cm. below a corresponding stalactite
S.-S. 7	N-6	2 60	Stal$^{m.}$ 1 00	0 00	1 20	Stalagmite entirely below ash-level
S.-S. 8	O-6		1 05		1 50	Stalagmite entirely below ash-level
S.-S. 9	O-2/3				1 55	"Stools" of stalagmites 10 cm. to 30 cm. below ash-level

---

[1] Abbreviations: Stal$^{m.}$ = stalagmite; Stal$^{ct.}$ = stalactite; S.-S. = stalactite-stalagmite.

Some of the stalactite-stalagmites were attached on one side to the wall, presenting the appearance of half-columns.

One stalagmite (No. 5) was taken to pieces and taken away, as well as one pendent stalagmitic "stool."

At the close of operations most of the stalagmites were thickly covered again with soil and stones; this was a precautionary measure of preservation.

The following abstract from Mr. Jacobs's report on the "bone-recess" is based on the work done after the departure of the directors.[1]

The "bone-recess" extends 5 m. in a northwesterly direction from the northwestern corner of the cavern. At the entrance are several irregular stalagmites numbered 7 and 8; their summits are all below the original level of the ashes in the cavern. Outside of this stalagmitic barrier the ashes, when examined, showed the same contents as elsewhere in the cavern, but with an increasing percentage of animal bones near the barrier.

Specimens of the material and contents of stalactite-stalagmites 7 and 8 were obtained, and then work was begun upon a soft deposit within the recess just back of the barrier; this was found to contain decayed organic matter, but fewer ashes; what bones and implements there were, were similar to those from the larger cavern.

In square metre O–4/5 a pit was sunk down to the underlying clay (Stratum B): the soft deposit above was 1 m. 5 cm. in depth, and contained stones of various sizes up to a thickness of 30 cm.

At a distance of 1 m. 50 cm. back from the entrance a heavy stratum of animal bones was met, embedded in the soft deposit above a large flat stone.

This continued for nearly 1 m. backward into the recess. One bone awl and a few flint chips formed part of the bone stratum, which itself was dry and is probably the driest part of the recess. In the rear there were many stones, 10 cm. to 40 cm. down in the soft deposit. This part is damper, and the decomposition of the bones may account for their lessened frequency here. A stalactitic-stalagmitic mass adhering to the south wall was numbered stalactite-stalagmite 9.

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[1] The complete report may be consulted at the Department of Archaeology of Phillips Academy.

A cross-section of the "bone-recess," 80 cm. in from the entrance, shows the recess already described to be at that point but the lower of two chambers.

The second chamber is perpendicularly above the first, and is separated from it by two blocks of fallen limestone. Of these the lower, 55 cm. thick, forms the roof of the lower chamber and a part of the floor of the upper; the upper block, lying partially on the lower, forms the remainder (on a different level) of the floor of the upper chamber. The walls of the upper chamber are lined with stalactitic deposits; there are none depending from the roof. Animal bones, "bone dirt," and stalactites enclosing bones were found in the upper chamber, but no stone implements.

The total height from the clay (Stratum B) to the roof of the upper chamber is 3 m. 20 cm. at a point 80 cm. within the entrance.

VI. HUMAN BURIALS

Six human burials were found in the ashes of Jacobs Cavern, from 45 cm. to 1 m. 30 cm. down.

They were in poor preservation, and in cases incomplete.

The known types of Indian burial called the "bundle" type and the "scissors" type were represented; these types have also been observed in the mounds of Mississippi.

A detailed description is subjoined.

Skeleton No.	Position	Depth		Orientation by End at which the Skull was Found
		m.	cm.	
1	A-15	0	80	West
2	D-14/15	1	30	South
3	F-11	0	45	North
4	F-15	0	70	Northeast
5	J-8	0	50	Southwest
6	I-10	1	30	North

VII. THE BONES OF ANIMALS

Seven-tenths of a cubic metre of animal bones were removed from the cavern; they are whole or in fragments; most of the latter have the appearance of having been split for marrow, others of having been boiled or otherwise cooked.

The following animals have been identified[1] from bones in the collection at Andover; they are contemporary with man's occupancy of the cavern:

Deer (*Cariacus virginianus*).
Raccoon (*Procyon lotor*).
Opossum (*Didelphys virginiana*).
Bear (*Ursus americanus*).
Beaver (*Castor canadensis*).
Turkey (*Meleagris gallopavo americanus*).
Gray Wolf (*Canis occidentalis*).
Elk (*Cervus canadensis*).
Buffalo (*Bos americanus*).
Woodchuck (*Arctomys monax*).
Tortoise (*Cistudo carolina*).
Hog (*Sus scrofa domestica*).

VIII. THE IMPLEMENTS OF STONE

The collection at Andover may be considered characteristic, though not complete; there are in the Department of Archaeology a collection from Jacobs Cavern, two surface collections, one carefully made by Mr. J. L. B. Taylor, the other gathered by the boys of Pineville, and a small collection from McElhaney Cavern.

The remainder of the specimens from Jacobs Cavern are, the majority of them, in the possession of the Smithsonian Institution of Washington or in that of Mr. Jacobs himself.

From Jacobs Cavern the larger implements were almost wanting.

Three stone metates (one of sandstone and one of them broken), one stone axe, one celt, and fifteen hammer-stones were found.

In projectile points and knives the collections are rich. A rough classification follows. In many cases a rejected, broken, or incomplete implement of one kind may have been used as a perfect implement of another. The hard and fast lines of division vary with the personal equation of the examiner, but the general proportion of types is a correct one.

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[1] By Dr. W. C. Farabee of Harvard University.

THE COLLECTION FROM JACOBS CAVERN

1. Implements, knives, or projectile points, when complete, 5 cm. or more in length:

A. Without stem:

a. More or less circular in form[1]		50
b. Oblong, generally without shoulder	α. Complete	13
	β. Incomplete	10
c. Flakes, generally long and thin		53
d. Pointed	α. At one end	31
	β. At both ends[2]	3
e. Scrapers, "humped type"		11
Total 1. A		171

A subdivision of 1. A. *d.* α (pointed at one end):

More or less triangular	αα. Base concave	4
	αβ. Base straight	3
	αγ. Base convex	3
	αδ. Base irregular	3
Leaf-shaped	αε. (Sides expanding from both ends)	18
Total		31

B. With stem:

a. Stem tapering:

α. Base of stem concave	Barbed[3]	0
	Not barbed	11
β. Base of stem straight	Barbed	4
	Not barbed	18
γ. Base of stem convex	Barbed	1
	Not barbed	12
δ. Base of stem pointed	Barbed	1
	Not barbed	7
ε. Base of stem irregular		2
Total 1. B. *a*		56

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[1] Some of these, doubtless, were scrapers.

[2] Sides convex.

[3] "Barbed" is defined as having an acute or reëntrant angle between the stem and the shoulder or shoulders.

b. Stem with sides straight:

α. Base of stem concave	**Barbed**	0
	Not barbed	3
β. Base of stem straight	**Barbed**	2
	Not barbed	0
γ. Base of stem convex	**Barbed**	1
	Not barbed	3
δ. Base of stem irregular		1
Total 1. B. *b*		10

c. **Stem expanding:**

α. **Base of stem concave**	**Barbed**	4
	Not barbed	11
β. **Base of stem straight**	**Barbed**	8
	Not barbed	2
γ. **Base of stem convex**	**Barbed**	23
	Not barbed	8
δ. **Base of stem irregular**		3
Total 1. B. *c*		59

C. Shouldered knives:

a. Broad type	*α.* Chipped on both sides		8
	β. "Spalls," or chipped on one side only		3
b. Long type	*α.* Chipped on both sides	Two cutting edges	37
		One cutting edge	6
	β. "Spalls" or chipped on one side only		4
Total 1. C			58

D. Perforators	5
E. Doubtful form	1

2. Implements, when complete, less than 5 cm. in length:

A. Without stem:

a. Knives, round type	*α.* Chipped on two sides	4
	β. "Spalls," or chipped on one side only	9
b. Knives, long type	*α.* Chipped on two sides	1
	β. "Spalls," or chipped on one side only	6
c. Points, triangular or leaf-shaped with sides	*α.* Concave	0
	β. Straight	0
	γ. Convex	8
Incomplete form		1
Total 2. A		29

B. With stem:

a. Stem tapering	α. Base of stem concave 0	Barbed . .	0
	β. Base of stem straight 1	Not barbed .	7
	γ. Base of stem convex . 5		
	δ. Irregular 1		
b. Stem with sides straight	α. Base of stem concave 0	Barbed . .	1
	β. Base of stem straight 1	Not barbed .	1
	γ. Base of stem convex . 1		
c. Stem expanding	α. Base of stem concave 5	Barbed . .	13
	β. Base of stem straight 6	Not barbed .	4
	γ. Base of stem convex . 6		
d. "Bunts"			4
Total 2. B			30

Summary of the Collection

1. Implements 5 cm. or more in length:			
A. Without stem		171	
B. With stem:			
a. Stem tapering	56		
b. Stem straight	10		
c. Stem expanding	59	125	
C. Shouldered knives		58	
D. Perforators		5	
E. Doubtful		1	
Total 1 (A, B, C, D, E)		360	360
2. Implements less than 5 cm. in length:			
A. Without stem		29	
B. With stem:			
a. Stem tapering	7		
b. Stem straight	2		
c. Stem expanding	17	26	
d. "Bunts"		4	
Total 2 (A, B)		59	59
Total Jacobs Cavern collection[1]			419

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[1] In addition to these, hundreds of cores, fragments, "spalls," and "rejects" of flint were brought to Andover for purposes of study and comparison.

THE SURFACE COLLECTION OF J. L. B. TAYLOR

A. Implements without stem:		
a. Knives, round form	25	
b. Knives, leaf-shape	11	
c. Knives, long form	11	
d. Knives or points, triangular	17	
e. Points, triangular, small	3	
f. Scrapers	3	70
B. Implements with stem:		
a. Stem tapering	39	
b. Stem straight	17	
c. Stem expanding	99	155
C. Shouldered knives		41
D. Perforators		2
E. "Bunts"		5
F. Small stemmed points		10
Total J. L. B. Taylor collection		283

Incomplete Objects

Knives, round	11
Knives, leaf-shaped	1
Knives, long form	12
Triangular forms	3
"Spuds"	2
Celt	1
	30

SURFACE COLLECTION FROM THE VICINITY OF PINEVILLE

A. Implements without stem:		
a. Knives, round	13	
b. Knives, leaf-shaped	3	
c. Knives, long form	2	
d. Knives or points, triangular	3	
e. Scrapers	3	24
B. Implements with stem:		
a. With stem tapering	33	
b. With stem straight	7	
c. With stem expanding	82	
d. Lance-point, stem expanding	1	123
C. Shouldered knives		36
D. Perforators		4
E. Axe, chipped		1
Total Pineville collection		188

THE COLLECTION FROM McELHANEY CAVERN

Knives or points, triangular		4
Knives or points with stem	Tapering	9
	Straight	0
	Expanding	5
Total McElhaney collection		18

FROM EDEN BLUFF

Knife or point with stem expanding	1

Noteworthy, from an examination of these lists, are the following facts:

First, the large number in proportion of knives of the round type; flat, rough, often chipped to the edge on one side only, these objects seem yet to have the right of being considered complete implements.

Second, the large proportion of knives, more or less rudely chipped, of the long, shouldered class; often a natural chip struck off from a core or a mass of flint will take a form almost ready for use, as such, as an implement.

Third, the comparative abundance of specimens with stems; in the Jacobs Cavern collection the stemmed specimens are 155 out of a total of 419, or 37 per cent.[1]

Fourth, the small proportion of specimens less than 5 cm. in length.

Fifth, the fact that while in the Jacobs Cavern collection, among the specimens with stem, there are with stems expanding 76 out of a total of 151,[2] or 50 per cent, in the J. L. B. Taylor collection they are 99[3] out of 155, or 64 per cent, and in the Pineville collection they are 83 out of 123, or 67 per cent.

This is a distinction possibly arising from a naïve selection in collecting surface specimens.

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[1] Shouldered knives are not considered stemmed.

[2] "Bunts" are here not counted.

[3] "Small tanged points" are here not counted.

Besides the collection at Andover there have been taken from Jacobs Cavern the following:

Knives	5
Knives or projectile points	21
Projectile points (smaller)	7
Perforators	3
Hammer-stones, etc.	24
Polishing stones	2
Metate, limestone	1
Metate, sandstone (broken)	1
Unfinished specimens	177
	241

Also there were removed hundreds of chips, "spalls," and cores showing human workmanship.

The rarity in this region is to be noticed of the larger "neolithic" implements, such as celts, grooved axes, pestles, "spuds," "plummets," and pipes; also the total absence of the so-called "ceremonials."

IX. POTTERY AND BONE

Fragments of pottery were present, but not abundant, in the ashes of Jacobs Cavern.

No complete vase, whole or in parts, was found. The type of pottery was rude, with primitive decoration and no attempt at coloring save by firing. The tempering was, as usual, of shell.

From the shape of the fragments the vases seem to have been, many of them, bowls or "pots," swelling considerably in the middle.

The most usual implement of worked horn or bone was the awl or needle of the long, tapering type. They were present in considerable numbers in the ashes.

The stalagmitic deposits, the "polished rocks," and the outside evidences of habitation may better be considered later.

X. EVIDENCES AS TO THE TIME, DURATION, AND CHARACTER OF THE OCCUPATION BY MAN OF JACOBS CAVERN

The evidences of man's occupancy may be classified as follows:

1. The quantity of the ashes.
2. The type of human remains.
3. The type of animal remains.
4. The type of implements and fragments.
5. The stalagmitic deposits.
6. The polished rocks.
7. Outside evidences.

1. At an estimate probably much below the true figure. there were 115 cu. m. of ashes in Jacobs Cavern; they covered the entire clay stratum (B) to a height of 50 cm. and more with a fairly homogeneous mass.

The presence of ashes in such quantities precludes the assumption of purely natural causes.

Fires produced by spontaneous combustion or by lightning, either inside or outside of the cavern, could not produce such a mass within and leave no trace without.

While no exact calculation of the rate of accumulation of ashes may be hazarded, there are certain determining conditions.

First, the daily occupancy of the cavern was probably longer in winter than in summer; hence a longer time would be required for the production of the ashes than were a constant fire to be assumed for the purpose of cooking and heating.

Second, the fires must have been either outside or inside: if outside, but a part of the ashes have been preserved; if inside, the conditions of smokiness must have necessitated small fires; in either case a long time of human occupancy must be assumed.

Third, a singular persistency in occupation is observed. Before excavation, the surface of the ashes was less than 2 m.

below the roof. The inhabitants must have found their later presence in the cavern to necessitate either a cramped position or a very limited floor space; it is conceivable, therefore, that the later accumulation went on more slowly, owing to more infrequent occupation.

The testimony of the ashes is, then, to establish long occupancy, not necessarily continuous, of the cavern.

2. Nothing indicating great antiquity has been inferred from examination of the human remains.

It is to be considered, however, that among the fragments of skeletons found in Jacobs Cavern the maximum femoral length is 43 cm., not that of a large man.

The Osages, the historical owners of the region, were according to Catlin the "largest and best-appearing" Indians seen by him. It is possible, therefore, that the burials are of another, hence earlier, people.[1]

From the carelessness and irregularity of the burials compared to the usual carefulness in this regard of the Red Indian, it is unlikely that these were deposited during the time of the apparently leisurely occupancy while the ashes were accumulating.

Occasional burials, much fewer in number than the deaths occurring in the course of nature, seem unlikely to have been made in the growing refuse-heap.

It is more probable that the six burials are posterior to the deposition of the ashes. The occupants producing the ashes would then appear to have been earlier than those who made the burials, and these in turn to have preceded the Osages.

The scant evidence, accordingly, of the skeletons is toward the greater antiquity of the earlier occupation.

3. No bones of extinct animals were found; all are of comparatively late animals of historical times.

The presence of the bones of domestic animals need not appear surprising; dogs or wolves can at any time readily carry bones away from the farmyards and deposit them in the cavern.

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[1] Cf. *Catalogue Raisonné de la Galerie Indienne de Mr. Catlin*, **Paris, 1845**, p. 8, *s.v.* "Osages."

The evidence, then, of the animals fails to show any great antiquity in any part of the ash stratum, and, from the absence of testimony to man's occupancy below this stratum, the ashes in their gradual accumulation may safely be taken to be representative of the whole of such occupancy from beginning to end.

4. The types of stone implements are quite different from those of the neighboring Arkansas-lower-Mississippi basin.

They are here ruder in form and finish, and the small arrow- and spear-points of the lower region are almost absent.

The large proportion of very rough knives — round, oblong, shouldered, and not shouldered (often by haphazard) — characterize the Ozark district, and are almost sufficient in themselves to determine a race of occupants different from the so-called "mound-builders."

This distinction is enforced by the absence of the finer pottery, as characteristic itself of the Arkansas-Missouri culture as are in Jacobs Cavern the knives.

To one versed for years in excavation, there comes a certain inexplicable feeling that the specimens from Jacobs Cavern "look old" in comparison to the mound specimens.

While again no proof is forthcoming, the tendency of what the specimens have to say is toward the greater antiquity.

5. The nine stalagmites, so far as observed, contained, from their base on the limestone clay up to the level of the ashes at the time of excavation, charcoal, animal bones, and flint chips in such numbers and embedded in such a way as to prove to the excavators the presence of man in the cavern during the period requisite for the formation of that part of the stalagmites. The deepest specimen found was buried 50 cm. perpendicularly down from the stalagmite's surface.

It remains to investigate the rate of growth of stalagmites, and unfortunately absolutely nothing can here be adduced with precision.

Observations made elsewhere are pertinent.

In Ingleborough Cave, Yorkshire, in the case of the stalagmite "Jockey Cap," through continual dropping the rate of increase was annually, from 1845 to 1873, 0.2946″ or 0.75 cm. in height.[1]

A stalagmite in Wyandotte Cave,[2] Indiana, has been observed to increase annually 0.01″ or 0.0254 cm.

Taking a stalagmite 50 cm. in height, if the rate of growth were that observed in Ingleborough Cave, 66 years would be required for its formation; if that in Wyandotte Cave is assumed, 1968 years would be required.

Hence we are forced to agree with Boyd-Dawkins,[3] Gordon,[4] and Martel[5] that thickness of stalagmitic deposit is of comparatively little moment in the determination of its age.

That this is so, it is only necessary to consider the determining factors in the growth of a stalagmite:

Rainfall.
Vegetation and the character of the surface soil.
Composition of the limestone medium.
Size of the crevices through which trickling takes place.
Rate of evaporation within the cave.
Presence of diverting bodies under the water flow.
Shifting of the stalactitic point of departure.

6. Outside and near the entrance to Jacobs Cavern are large rocks, presenting on large parts a brilliant polish, quite different from weathering and akin to that found especially on the "spades" and "hoes" of Tennessee, produced, we may suppose, by friction between the implement and skins or some other oily substance.

That the rocks have been polished by the naked bodies or the skin clothing of human beings becomes more probable when we find that, though a few other rocks with a similar polish exist in the Ozark district, they are not present where other evidences of man's occupancy are lacking. The polished rocks indicate a long occupation. The only similar cases known to the explorers are provided by the walls of the stone gallery at Tiryns, where the polishing is said to be due to the herding of sheep for centuries in that celebrated place.

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[1] Boyd-Dawkins, *Cave-Hunting*, pp. 39–40.

[2] H. C. Hovey, *Celebrated American Caverns*, pp. 137, 139, 191.

[3] *Cave-Hunting*, p. 40.

[4] *Caverns of Copan*, Mems. Peabody Museum, Vol. I. No. 5, p. 12 (148).

[5] *La Spéléologie*, Paris, 1900, pp. 102–103.

7. The historical owners of Jacobs Cavern were the Osage Indians, a Plains tribe owning and rejoicing in horses in white men's times.

At Eden Bluff are pictographs upon the rocks, presumably done by the occupants of caves in the vicinity. These contain the usual cosmic symbols, but no suggestions of horses; the same absence of horses elsewhere, notably in the Southwest, has been noted.

It is probable that either the pictographs are the product of another, and therefore earlier, race than the Osages, or that they were done in prehistoric or protohistoric times by the Osages themselves.

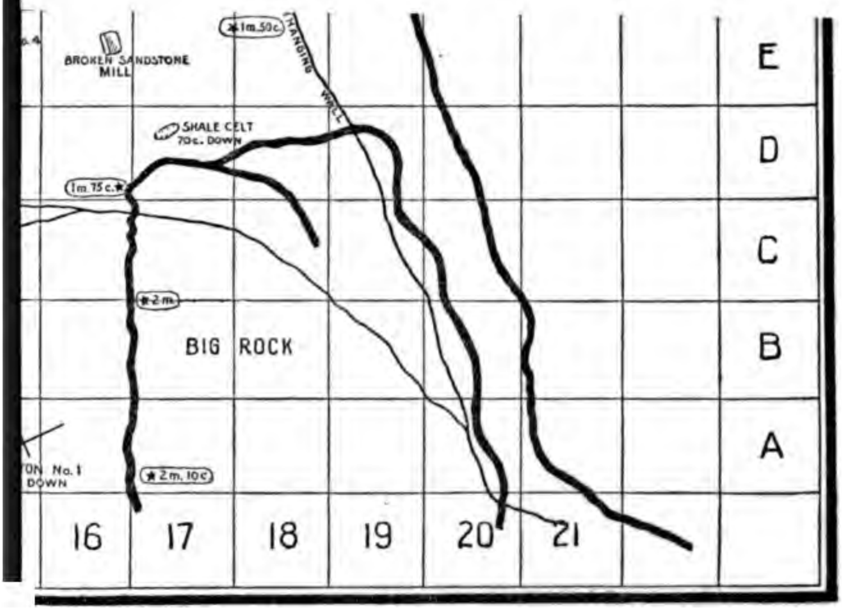
XI. CONCLUSION

The evidence from the quantity of the ashes, the types of implements, the stalagmitic deposits, is toward the assumption of a very early and protracted occupancy of Jacobs Cavern by man.

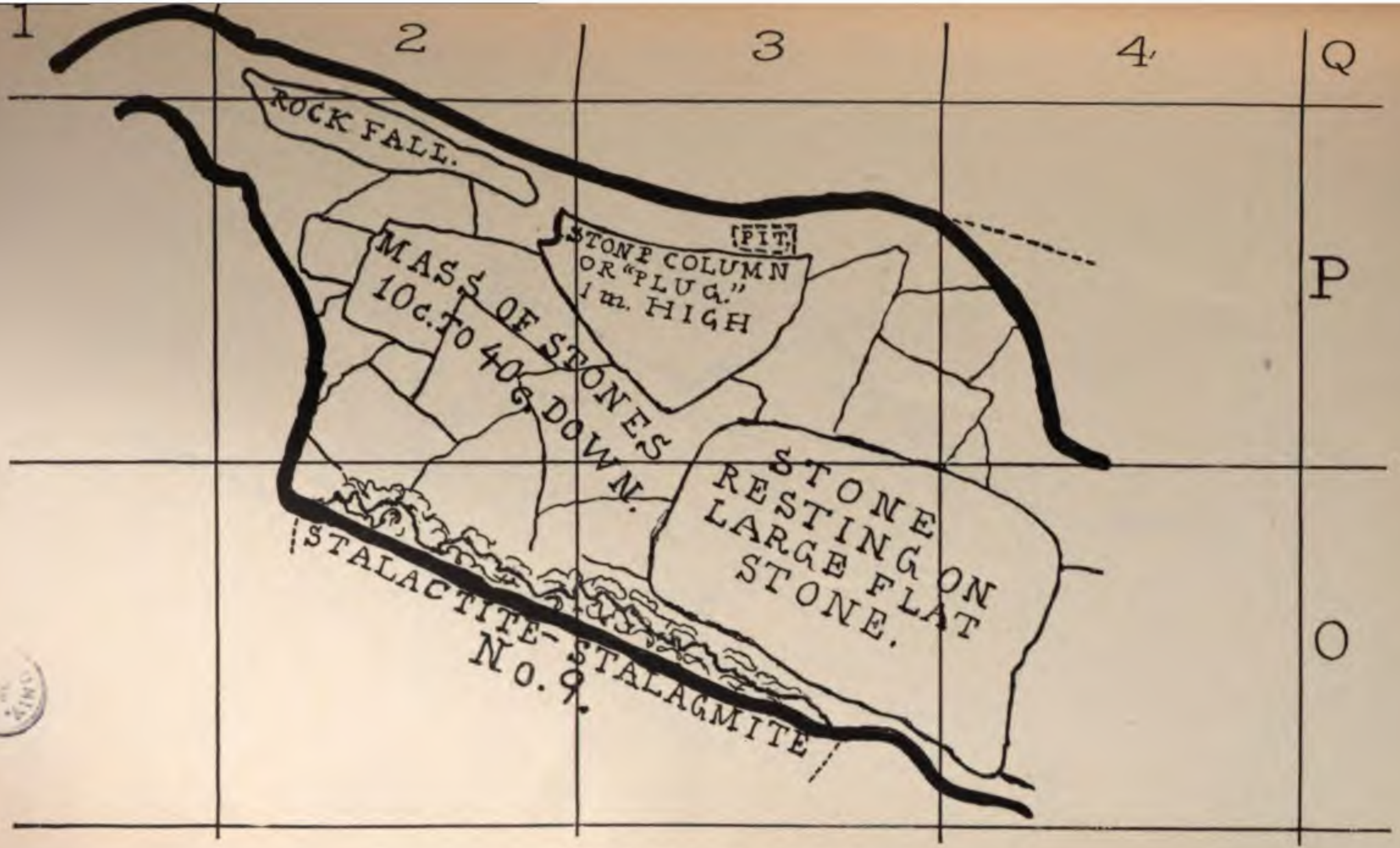
That the occupants were different from the Osages and also from the lower Mississippi tribes is negatively suggested by the human remains, the pictographs, and again by the types of implements.

The polished rocks point to a long occupation, and its date and length, while not supported, is not denied by the animal remains.

An early inhabiting of the cavern by man, who continued to abide there, perhaps hundreds, perhaps thousands, of years, is all that may at present be asserted.



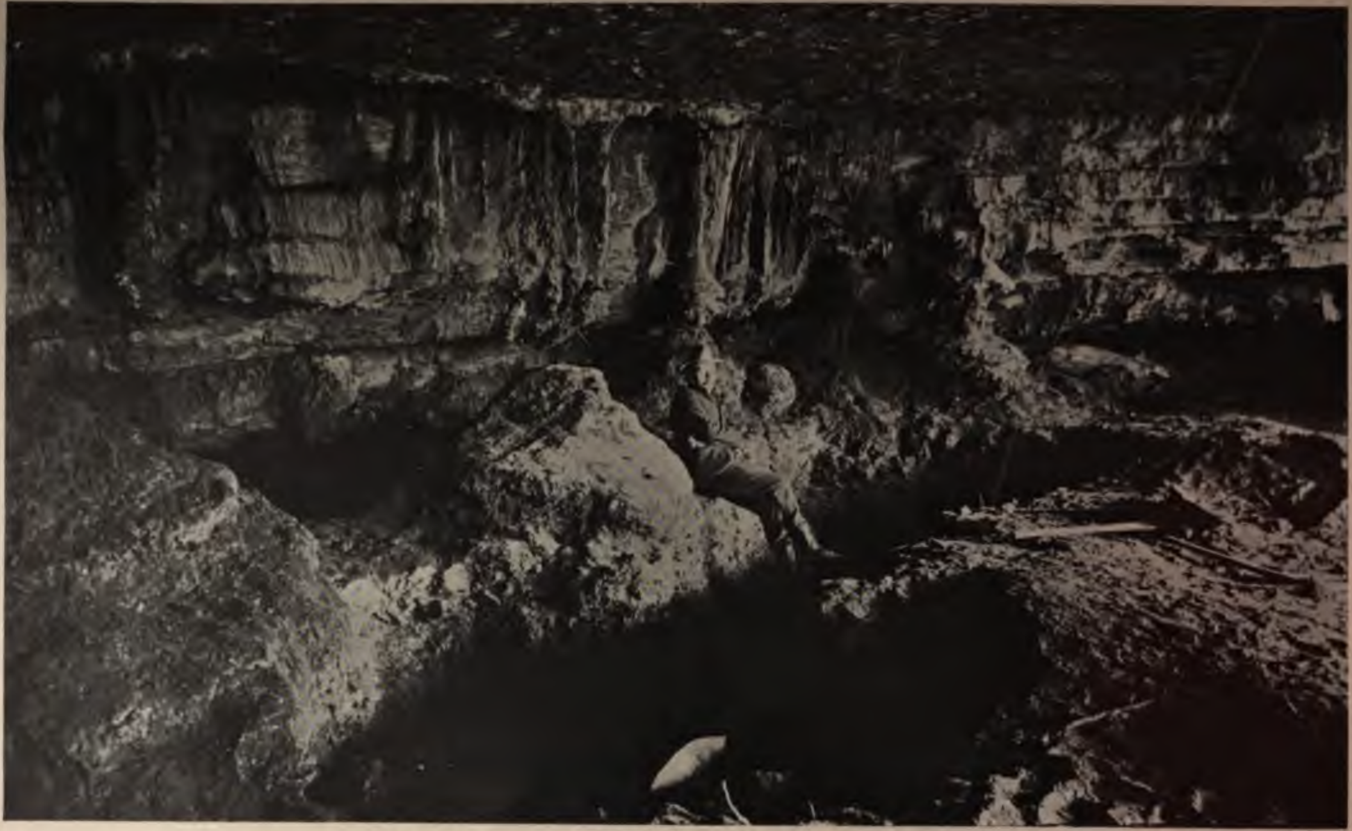
BROKEN SANDSTONE MILL
★1m.50c.
HANGING WALL
SHALE CELT 70c. DOWN
1m.75c.★
★2m.
BIG ROCK
★2m.10c.
ON No. 1 DOWN
E
D
C
B
A
16
17
18
19
20
21


1
2
3
4
Q
P
O
ROCK FALL.
MASS OF STONES 10c. TO 40c. DOWN.
PIT
STONE COLUMN OR "PLUG." 1 m. HIGH
STONE RESTING ON LARGE FLAT STONE.
STALACTITE-STALAGMITE No. 9.

JACOBS CAVERN: BONE RECESS

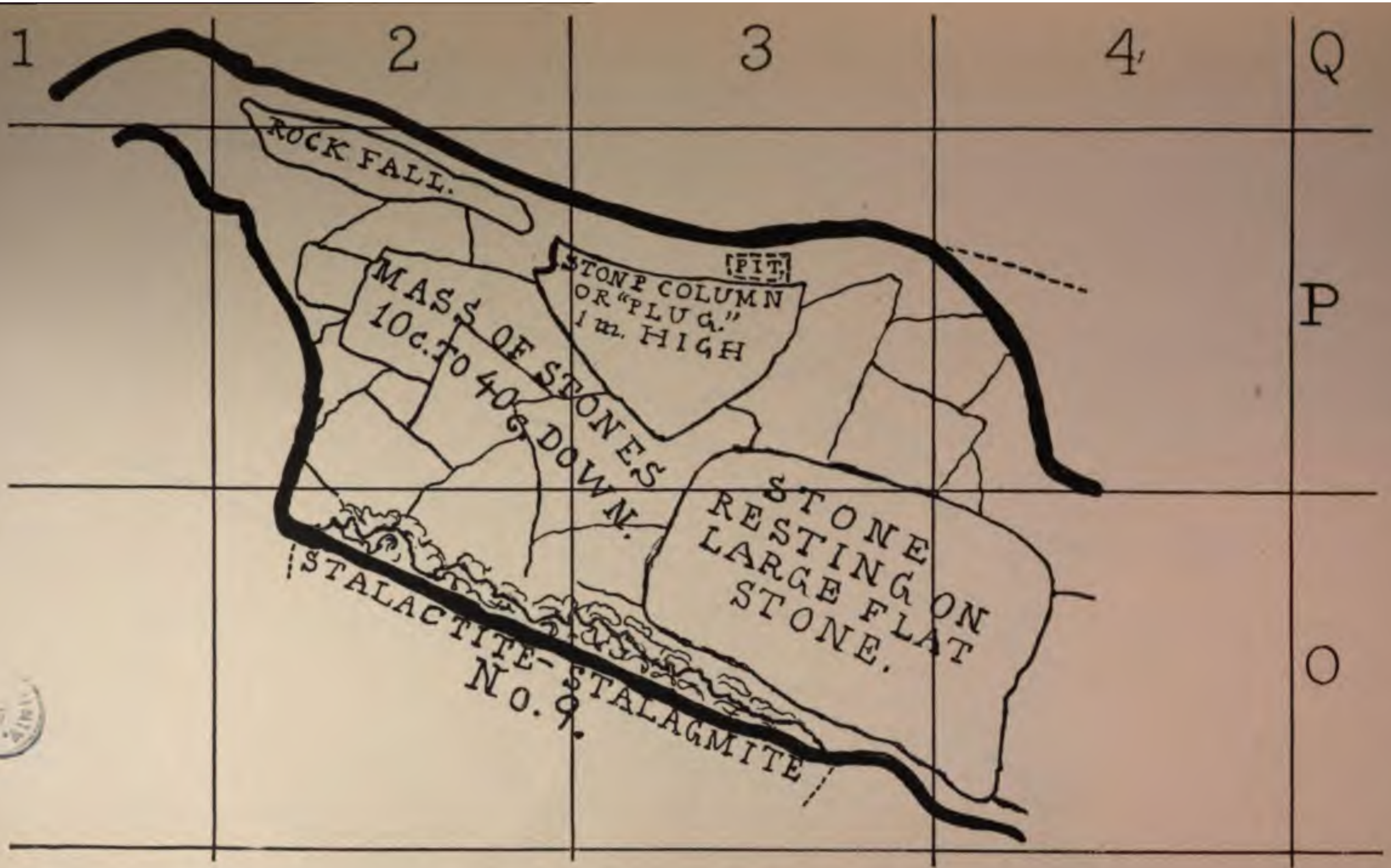
BY E. H. JACOBS

PLATE II



JACOBS CAVERN: ROW OF STALACTITES AND STALAGMITES

UNIV. OF MICH.


1
2
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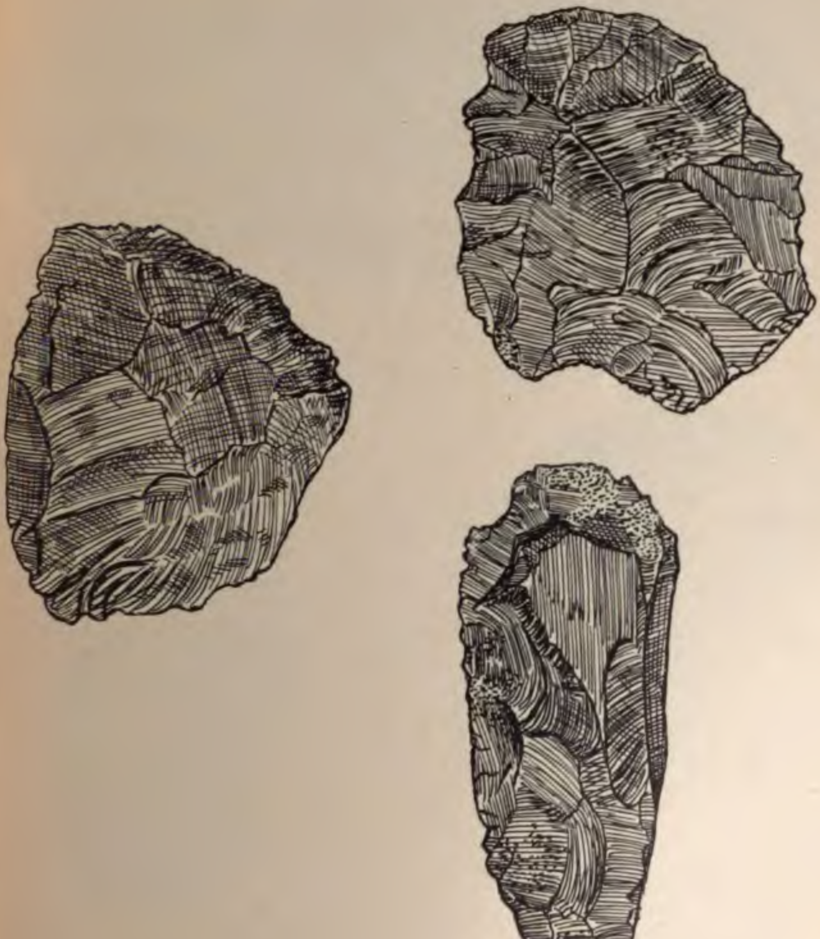
Q
P
O
ROCK FALL.
PIT
STONE COLUMN OR "PLUG." 1 m. HIGH
MASS OF STONES 10c. TO 40c. DOWN.
STONE RESTING ON LARGE FLAT STONE.
STALACTITE-STALAGMITE No. 9.

JACOBS CAVERN: BONE RECESS

BY E. H. JACOBS

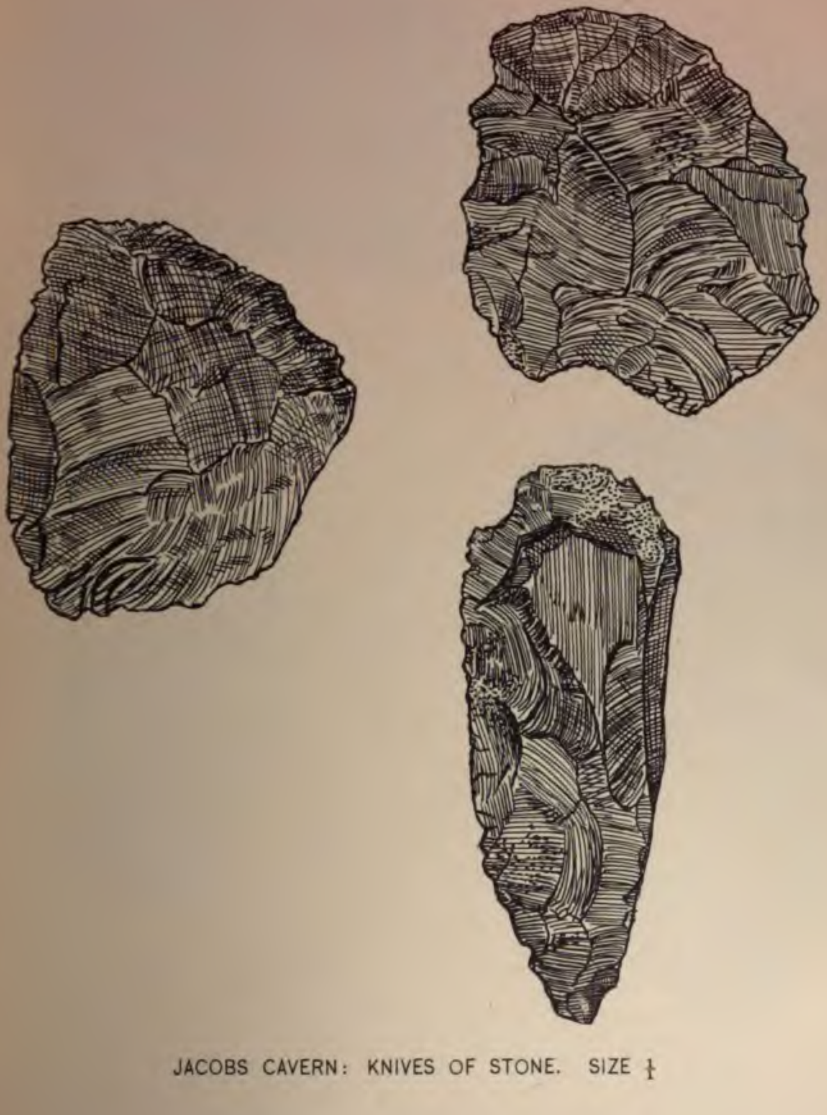
PLATE V



JACOBS CAVERN: KNIVES OF STONE. SIZE ½

UNIV. OF MICH.

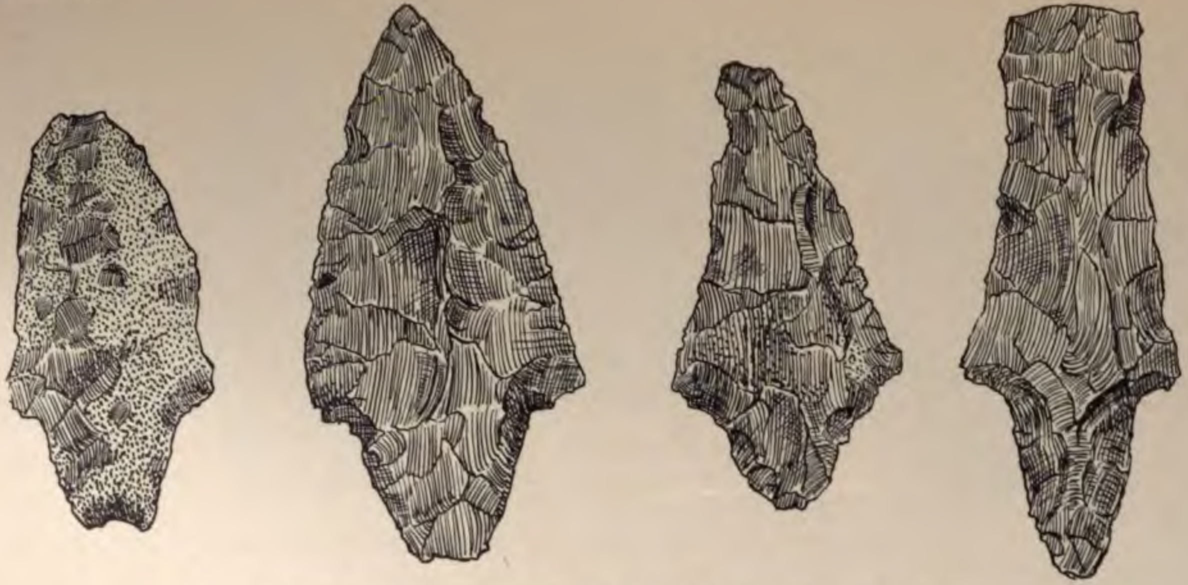
PLATE V



JACOBS CAVERN: KNIVES OF STONE. SIZE 1/1

UNIV. OF MICH.

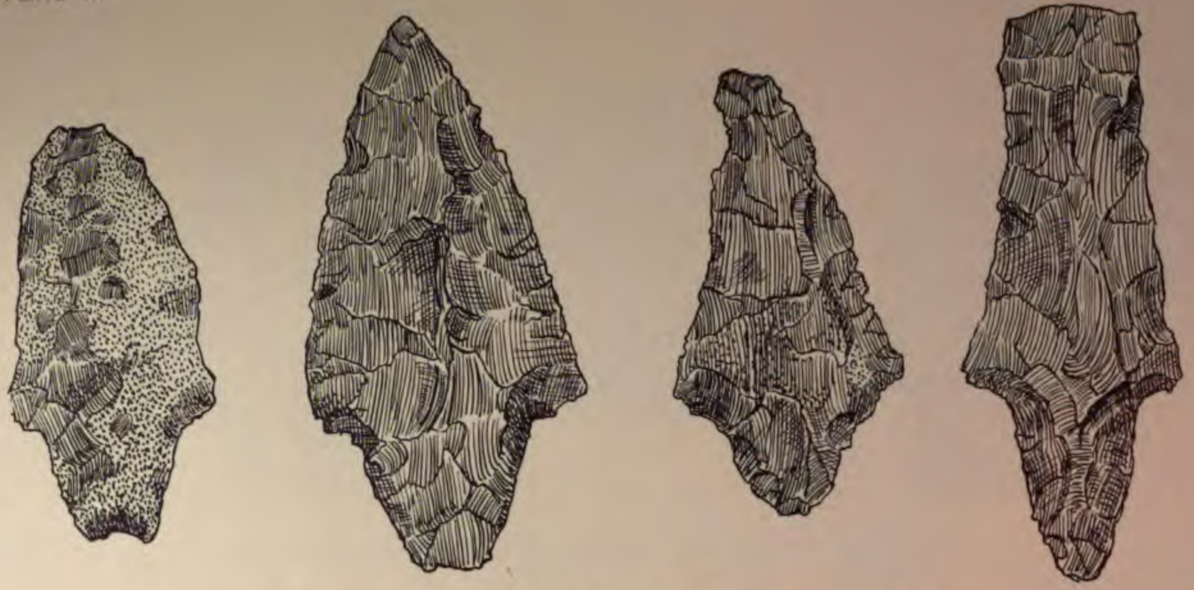
PLATE VII



JACOBS CAVERN: IMPLEMENTS WITH STEM TAPERING. SIZE ½

UNIV. OF MICH.

PLATE VII



JACOBS CAVERN: IMPLEMENTS WITH STEM TAPERING. SIZE $\frac{1}{1}$

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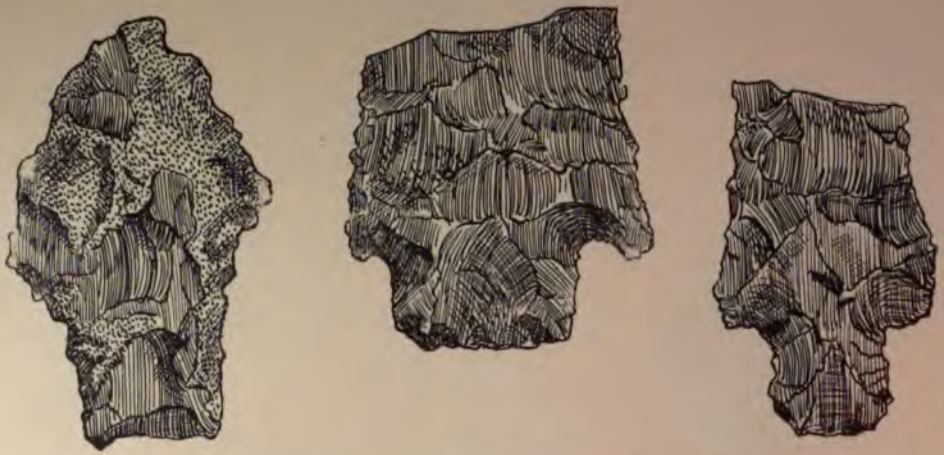
PLATE VIII



JACOBS CAVERN: IMPLEMENTS WITH STEM NEARLY STRAIGHT. SIZE $\frac{1}{1}$

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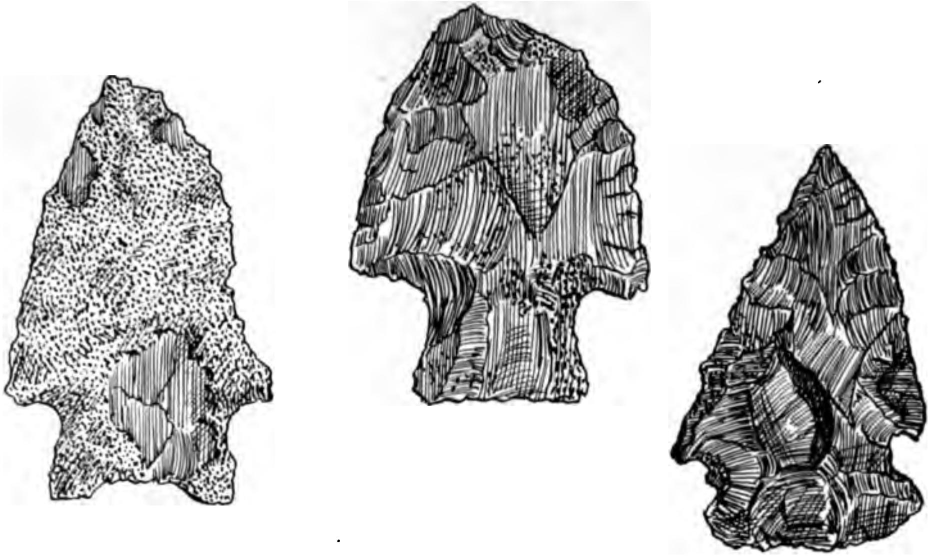
PLATE IX



JACOBS CAVERN: IMPLEMENTS WITH STEM EXPANDING. SIZE 1/1

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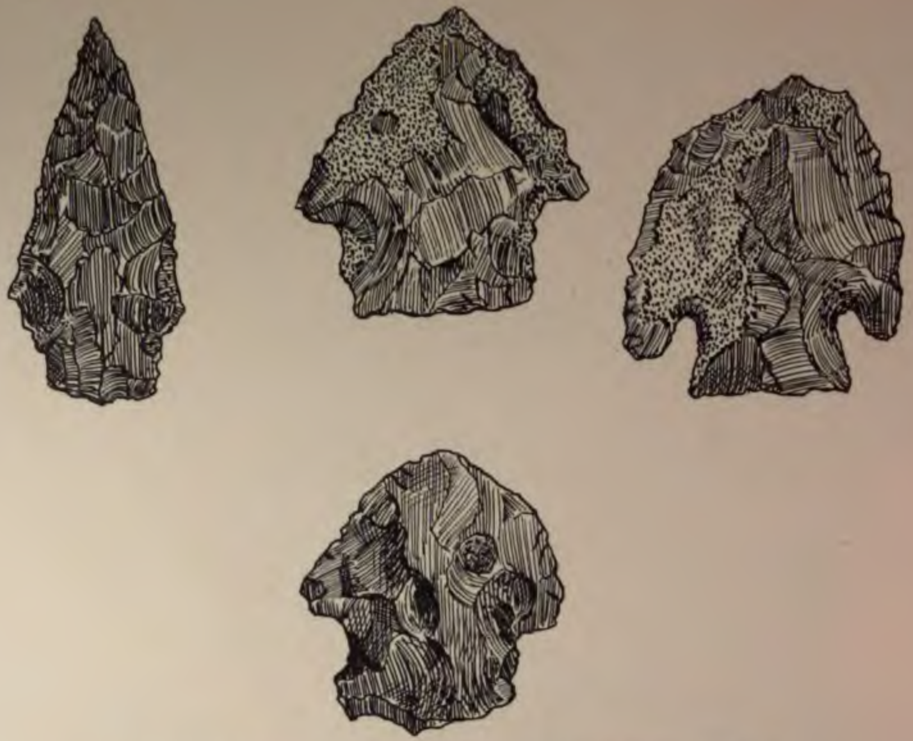
PLATE X



JACOBS CAVERN: SMALLER CHIPPED IMPLEMENTS. SIZE $\frac{1}{1}$

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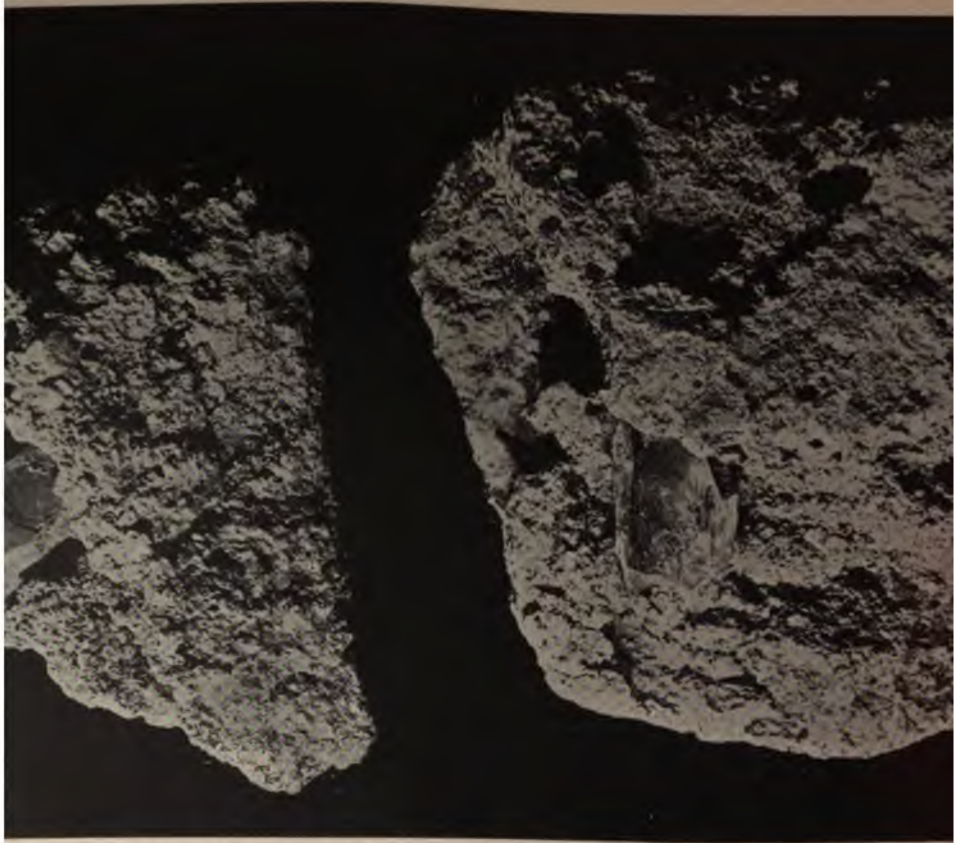

JACOBS CAVERN: STALAGMITIC MATERIAL WITH FLINT AND BONE

So

PHILLIPS ACADEMY, ANDOVER, MASSACHUSETTS
DEPARTMENT OF ARCHAEOLOGY

BULLETIN II

THE
So-Called "Gorgets"

CHARLES PEABODY AND W. K. MOOREHEAD

1906

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Plate XIX.
Class 5 B and 10. Specimens from Phillips Academy.

THE SO-CALLED "GORGETS".

The present article deals with a type of specimens common in the United States of America and rare elsewhere to which the name "Gorget" has been applied. This occurred either from an assumed use of the stone as a throat-ornament or from some fancied resemblance in appearance between occasional members of the "gorget" class and the bit of neck armor that went or goes by the name. In either case the name is unfortunate; the specimens are in but few instances suitable for a neck-decoration or to be strung on necklaces, and many of them do not resemble the piece of armor referred to.

This monograph deals with the specimens that may be classed under the heading "gorgets" with the exception, however, of the so-called "gorgets" of shell with conventional or conventionalized decorations that are characteristic of Tennessee and the adjoining states. Their uses and meaning require a separate treatise, and their comparison with similar or dissimilar designs from Mexico demands a specialist in the history of art and in the archaeology of Southern North America. In a note are given a few references to articles on "gorgets" of this class.[1]

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[1] Jones, C. C. *Antiquities of the Southern Indians.* 1873. pp. 515 ff. and plate XXX, 3 and 4.

Holmes, W. H. *Art in Shell.* Rep. Bur. Eth. 2., 1880-'81. pp. 267 ff.

Thruston, G. P. *Antiquities of Tennessee.* 1890. pp. 322 ff. and figs. 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 245, 246. Pls. XVI and XVII.

Putnam, F. W. and Willoughby, C. C. *Symbolism in Ancient American Art.* Proceedings of the American Association for the Advancement of Science. No. 44, 1895. Section II. Anthropology, pp. 302 ff.

Starr, F. *A Shell Gorget from Mexico.* Proceedings Davenport Academy of Nat. Sciences, Vol. VI, 1896, pp. 173 ff.

Thruston, G. P. *Engraved Shell Gorgets and Flint Ceremonial Implements.* Amr. Ant. XIX, 1897, pp. 96 ff.

Thomas, C. *American Archaeology.* 1898. p. 70 and fig. 18.

Saville, M. H. *Shell Gorget from Huasteca, Mexico.* Bull. Am. Mus. N. H., N. Y. No. XIII, 1900. Art. X, pp. 99 ff.

Like many other specimens in the so-called "ceremonial" class "gorgets" are of unknown use and application. In treating the subject, therefore, there is needed a close study of the specimens, themselves and a careful search for analogies in the various archaeological literatures and throughout collections in all nations. There follow then, first a description of the natural qualities of "gorgets," second, a synopsis of analogies, and, last, a detailed investigation of individual specimens that show significant characteristics.

The term "gorgets" includes a series of objects of various materials, of an average length of ten centimeters, width of four centimeters, and thickness of nine millimeters. The shape varies, and, for the more typical specimens, may be said to range from that of "banner-stones" on the one hand to that of ordinary pendants on the other — indeed many of the latter must be included under the present discussion.

As a basis of classification shape is largely the determining factor. "Gorgets" are described as having two ends which may be rounded, pointed or squared, two sides which may be concave, straight or convex, and two faces which may be concave, straight or convex.

Each specimen in the tables has also been studied as to its length, breadth and thickness, its material, provenance, perforations, and any signs it may carry of wearing by use. The perforations have also been studied in regard to their number, position and countersinking. A perforation is described as countersunk when it possesses a diameter decreasing with the distance from the face.

Holmes, W. H. *Shell Ornaments from Kentucky and Mexico.* Smithsonian Misc. Coll. Vol. XLV. Pub. No. 1419. 1904. Vol. I Quarterly Issue. Parts 1 and 2. pp. 97 ff.

Peet, S. D. *The Southern Mound Builders.* Amr. Ant. Vol. XXV. 1903. No. 4, pp. 234 ff.

Peet, S. D. *The Migration of Symbols.* Editorial Article. Am. Ant. Vol. XXV. 1903. No. 5, pp. 318 ff.

Peet, S. D. *Comparison of the Codices with the Ordinary Pictographs.* Am. Ant. Vol. XXVI, 1904. No. 3, pp. 135 ff.

Cf. Series of shell gorgets in Peabody Museum. Nos. 2954, 2956, 2997, 2998, 4749, etc., etc. (Tennessee.)

The countersinking has been studied in regard to upon which face, where significant, lies the larger diameter of the perforation; in other words, generally, upon which face has been done the greater countersinking. There follow a description of classes and summaries of the qualities above mentioned of the "gorgets" contained in the Peabody Museum, Cambridge, Massachusetts, and in the Exhibition of the Department of Archaeology of Phillips Academy, Andover, Massachusetts.

The studies and measurements of the latter were made by Mr. Warren K. Moorehead, Curator at Andover and of the former by Dr. Charles Peabody, Honorary Director of the Department at Andover. It is a pleasure here to express the gratitude and appreciation of the authors to the officers of the Peabody Museum, notably Professor Frederick Ward Putnam and Mr. Charles C. Willoughby, the Assistant Curator for their courtesy in allowing an absolutely free use of the Museum, its collections, libraries, laboratory and photographic apparatus, and for time spent and suggestions made without which the present discussion would be inadequate.

In any description of objects whose forms are humanly determined, an exact limitation of classes is not possible; one division or subdivision encroaches upon the territory of its neighbor; exact boundaries are no more to be found than the termination of a repetend.

In like manner the personal equation enters into the active work of the student of specimens. Had the two collections been studied inversely by the authors or by others the statistics would not be identical, nor would they be identical were the same men to repeat their task. As in a composite photograph or an impressionist picture, blurred outlines do not impair the truth of the presentation, and individual variation in either the makers of the object or in the investigators has little influence on the sum total of results.

The following classification is based upon and expanded from that of A. E. Douglass.[2]

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[2] *Geographical Distribution of Relics.* Bull. Am. Mus. of Nat. Hist., N. Y. Vol. VIII, Art. X. 1896. pp. 199-220.

CLASSIFICATION OF "GORGETS".

Class 1.[3]		Spade-shaped.
Class 2.		Ovate. Ends rounded.
	A.[4]	Sides concave.
	B.[5]	Sides straight or irregular.
	C.[6]	Sides convex.
Class 3.[7]		Leaf-shaped. Ends pointed.
Class 4.[8]		Spear-shaped. One end pointed.
Class 5.		Rectangular.
	A.[9]	Sides concave.
	B.[10]	Sides straight.
	C.[11]	Sides convex.
Class 6.[12]		Ridged. Surface elevated.
Class 7.[13]		Expanded at middle.
Class 8.[14]		Shield-shaped.
Class 9.		Pendants.
	A.[15]	Celt-shaped.
	B.[16]	Rectangular.
	C.[17]	Oval or circular.
Class 10.		Unusual forms.

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[3] Cf. Pl. I. 1.
[4] Cf. Pl. X. Fig. 3.
[5] Cf. Pl. I. 2.
[6] Cf. Pl. I. 3.
[7] Cf. Pl. I. 4.
[8] Cf. Pl. I. 5.
[9] Cf. Pl. II. 1.
[10] Cf. Pl. II. 2.
[11] Cf. Pl. II. 3.
[12] Cf. Pl. II. 4.
[13] Cf. Pl. III. 1.
[14] Cf. Pl. III. 2.
[15] Cf. Pl. III. 3.
[16] Cf. Pl. III. 4.
[17] Cf. Pl. III. 5.

There follow the summaries of the specimens first of the Peabody Museum, second of the Department of Archaeology at Andover.

The tables are printed here in immediate succession for comparison; the comments necessary will follow — themselves grouped together.

EXPLANATIONS AND ABBREVIATIONS.

Av. proportion = $\frac{\text{Av. length.}}{\text{Av. breadth.}}$

Irr. = irregular.

B. = banded.

St. = stone.

Equid. = equidistant.

Unfin. = unfinished.

Av. = average = total ÷ no. of specimens.

L. = length.

Br. = breadth.

T. = thickness.

Max. = maximum.

Min. = minimum.

Cve. = concave.

Fl. = flat.

Cx. = convex.

Irr. = irregular.

U. = undetermined.

Perf. = perforation.

F., Ff. = face, faces.

S., Ss. = side, sides.

Ck. = countersunk.

N. S. = not significant.

Cen. = centre.

Diam. = diameter.

W. = with.

PEABODY MUSEUM. CLASS. 1. SPADE-SHAPED.

Specimens No.				5
Material. Limest			1	
Slate			1	
Slate (B)			3	5
Av. length	cm.	11.4		
“ breadth	cm.	5.7		
“ thickness	mm.	9.2		
“ proportion		2.		
Extremes.				
Max. l.	cm.	14.5		
Min. l.	cm.	9.		
Max. br.	cm.	11.		
Min. br.	cm.	4.		
Faces. Specimens with				
1 cve. 1 fl.			0	
1 cv. 1 cx.			0	
1 fl. 1 cx.			0	
2 cve.			0	
2 fl.			5	
2 cx.			0	
Irr.			0	
U.			0	5
Where from.				
Ky.			1	
N. Y.			1	
O.			1	
Pa.			1	
Tenn.			1	5

Perforations.		
Specimens w. 0 perf.	0	
“ “ 1 “	5	
“ “ 2 “	0	
“ “ 3 “	0	5
Countersinking.		
Specimens w. perfs. ck. 1 f.	1	
“ “ “ ck. 2 ff.	4	
“ “ “ not ck.	0	
“ “ countersinking irr.	0	5
Specimens w. larger diam. cve. f.	0	
“ “ “ “ fl. f.	2	
“ “ “ “ cx. f.	0	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	0	
“ “ no larger diam. or “ “ larger diam. n. s.	3	5
Position.		
Of the specimens w. 1 perf.		
Perf. near cen.	2	
“ “ end	3	5
Of the specimens w. 2 perfs.		
Perfs. near cen.	0	
“ “ end	0	0
Wearing. (Perfs.)		
Specimens worn	0	
“ not “	5	5

PEABODY MUSEUM. CLASS 2. A. OVATE. SIDES CONCAVE.

Specimen No.				3
Material. Slate			1	
Slate (B)			1	
Steatite			1	3
Av. l.	cm.	11.0		
Av. br.	cm.	4.8		
Av. t.	mm.	8.7		
Av. proportion		2.3		
Extremes.				
Max. l.	cm.	13.5		
Min. l.	cm.	6.5		
Max. br.	cm.	7.		
Min. br.	cm.	3.		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			0	
2 cve.			0	
2 fl.			2	
2 cx.			1	
Irr.			0	
U.			0	3
Where from.				
O.			1	
W. Va.			2	3

Perforations.		
Specimens w. 0 perf.	0	
“ “ 1 “	0	
“ “ 2 “	3	
“ “ 3 “	0	3
Countersinking.		
Specimens w. perfs. ck. 1 f.	1	
“ “ “ ck. 2 ff.	2	
“ “ “ not ck.	0	
“ “ cking. irr.	0	3
Specimens w. larger diam. cve. f.	0	
“ “ “ “ fl. f.	0	
“ “ “ “ cx. f.	0	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	0	
“ “ no “ “ or	0	
“ “ “ “ n. s.	3	3
Position.		
Of the specimens w. 1 perf.		
Perf. near cen.		
“ “ end		
Of the specimens w. 2 perfs.		
Perfs. near cen.	1	
“ “ end	1	
“ equid.	1	3
Wearing. (Perfs.)		
Specimens worn	2	
“ not “		
or with wearing n. s.	1	3

PEABODY MUSEUM. CLASS 2. B. OVATE. SIDES IRREGULAR

Specimen No.				7
Material.				
Slate			5	
Steatite			2	7
Av. l.	cm.	8.6		
Av. br.	cm.	3.9		
Av. t.	mm.	9.9		
Av. proportion		2.2		
Extremes.				
Max. l.	cm.	10.		
Min. l.	cm.	6.5		
Max. br.	cm.	5.		
Min. br.	cm.	2.5		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			1	
2 cve.			0	
2 fl.			3	
2 cx.			3	
Irr.			0	
U.			0	7
Where from.				
Ky.			1	
W. Va.			6	7

Perforations.		
Specimens w. 0 perf.	0	
" " 1 "	2	
" " 2 "	5	
" " 3 "	0	7
Countersinking.		
Specimens w. perfs. ck. 1 f.	0	
" " " ck. 2 ff.	6	
" " " not ck.	1	
" " cking. irreg.	0	7
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	0	
" " " " cx. f.	0	
" " " " lower f.	0	
" " " " upper f.	0	
" " no " " or		
" " " " n. s.	7	7
Position.		
Of the specimens w. 1 perf.		
Perf. near cen.	2	
" " end	0	2
Of the specimens w. 2 perfs.		
Perfs. near cen.		
" " end	2	
" equid.	2	
" irr.	1	5
Wearing. (Perfs.)		
Specimens worn.	2	
" not "		
or n. s.	5	7

PEABODY MUSEUM. CLASS 2. C. OVATE. SIDES CONVEX.

Specimens No.				13
Material. Slate			5	
Slate (B)			2	
Soapst.			4	
Steatite			2	
Av. l.	cm.	6.8		
Av. br.	cm.	3.9		
Av. t.	mm.	12.0		
Av. proportion		1.74		
Extremes.				
Max. l.	cm.	9.5		
Min. l.	cm.	5.		
Max. br.	cm.	5.5		
Min. br.	cm.	3.		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			3	
1 fl. 1 cx.			4	
2 cve.			0	
2 fl.			3	
2 cx.			3	
Irr.			0	
U.			0	13
Where from.				
Ind.			1	
Mass.			1	
N. J.			1	
O.			1	
W. Va.			9	13

Perforations.		
Specimens w. 0 perf.	0	
" " 1 "	3	
" " 2 "	10	
" " " "	0	13
Countersinking.		
Specimens w. perfs. ck. 1 f.	1	
" " " ck. 2 ff.	10	
" " " not ck.	2	
" " cking irr.	0	13
Specimens w. larger diam. cve. f.	2	
" " " " fl. f.	2	
" " " " cx. f.	1	
" " no " " or		
" " " " n. s.	8	13
Position.		
Of the specimens w. 1 perf.		
Perf. near cen.	3	
" " end	0	3
Of the specimens w. 2 perfs.		
Perfs. near cen.	0	
" " end	8	
" equid.	2	10
Wearing. (Perfs.)		
Specimens worn	3	
" not "		
or w. wearing n. s.	10	13

PEABODY MUSEUM. CLASS 3. LEAF-SHAPED.

Specimens No.				6
Material. Slate.			4	
Soapst.			1	
Steatite.			1	6
Av. l.	cm.	7.7		
Av. br.	cm.	3.8		
Av. t.	cm.	10.3		
Av. proportion	mm.	2.		
Extremes.				
Max. l.	cm.	11.0		
Min. l.	cm.	4.0		
Max. br.	cm.	5.5		
Min. br.	cm.	2.		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			2	
2 cve.			0	
2 fl.			3	
2 cx.			1	
Irr.			0	
U.			0	6
Where from.				
O.			1	
W. Va.			5	6

Perforations.		
Specimens w. 0 perf.	0	
“ “ 1 “	3	
“ “ 2 “	3	
“ “ 3 “	0	6
Countersinking.		
Specimens w. perfs. ck. 1 f.	0	
“ “ “ ck. 2 ff.	5	
“ “ “ not ck.	1	
“ “ cking. irr.	0	6
Specimens w. larger diam. cve. f.	0	
“ “ “ “ fl. f.	1	
“ “ “ “ cx. f.	0	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	0	
“ “ no “ “ or	0	
“ “ “ “ n. s.	5	6
Position.		
Of the specimens w. 1 perf.		
Perf near cen.	3	
“ “ end	0	3
Of the specimens with 2 perf.		
Perfs. near cen.	0	
“ “ end	2	
“ equid.	1	3
Wearing. (Perfs.)		
Specimens worn	1	
“ not “ or		
w. wearing n. s.	5	6

PEABODY MUSEUM. CLASS 4. SPEAR-SHAPED.

Specimens No.			5
Material. Bone			5
Av. l.	cm.	10.8	
Av. br.	cm.	2.5	
Av. t.	mm.	5.4	
Av. proportion		4.3	
Extremes.			
Max. l.	cm.	12.0	
Min. l.	cm.	9.0	
Max. br.	cm.	3.0	
Min. br.	cm.	2.0	

Faces. Specimens w.		
1 cve. 1 fl.	0	
1 cve. 1 cx.	4	
1 fl. 1 cx.	1	
2 cve.	0	
2 fl.	0	
2 cx.	0	
Irr.	0	
U.	0	5
Where from.		
Mich.	5	5

Perforations.		
Specimens w. 0 perf.	0	
" " 1 "	0	
" " 2 "	1	
" " 3 "	4	5
Countersinking.		
Specimens w. perfs. ck. 1 f.	0	
" " " ck. 2 ff.	5	
" " " not ck.	0	
" " cking. irr.	0	5
Specimens w. larger diam. cve. f.	1	
" " " " fl. f.	0	
" " " " cx. f.	1	
" " " " lower f.	0	
" " " " upper f.	0	
" " no " " or		
" " " " n. s.	3	5
Position.		
Of the specimens w. 1 perf.		
Perf. near cen.		
" " end		
Of the specimens w. 2 perfs.		
Perfs. near cen.	1	
" " end	0	
" equid.	0	
W. 2 perfs. near cen. and 1 at end	4	5
Wearing. (Perfs.)		
Specimens worn	0	
" not "		
w. wearing n. s.	5	5

PEABODY MUSEUM. CLASS 5. A. RECTANGULAR.
SIDES CONCAVE.

Specimens No.				8
Material. Limest.			1	
Slate			5	
B. Slate			2	8
Av. l.	cm.	10.1		
Av. br.	cm.	5.9		
Av. t.	mm.	10.1		
Av. proportion		1.7		
Extremes.				
Max. l.	cm.	12.0		
Min. l.	cm.	8.0		
Max. br.	cm.	7.5		
Min. br.	cm.	3.5		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			1	
1 fl. 1 cx.			3	
2 cve.			0	
2 fl.			4	
2 cx.			0	
Irr.			0	
U.			0	8
Where from.				
Mass.			1	
Ind.			1	
O.			6	8

Perforations.		
Specimens w. 0 perf.	1	
" " 1 "	0	
" " 2 "	0	
" " 3 "	7	8
Countersinking.		
Specimens w. perfs. ck. 1 f.	3	
" " " ck. 2 ff.	3	
" " " not ck.		
" " cking irr.	1	7
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	1	
" " " " cx. f.	2	
" " " " lower f.	0	
" " " " upper f.	0	
" " no " " or		
" " " " n. s.	4	7
Position.		
Of the specimens w. 1 perf.		
Perf. near cen.		
" " end		
Of the specimens w. 2 perfs.		
Perfs. near cen.	5	
" " end	0	
" " equid.	2	7
Wearing. (Perfs.)		
Specimen worn	2	
" not " or		
w. wearing n. s.	5	7

PEABODY MUSEUM. CLASS 5. B. RECTANGULAR. SIDES STRAIGHT.

Specimens No.				6
Material. Copper			1	
Schist			1	
Slate			3	
Slate (B)			1	6
Av. l.	**cm.**	**10.0**		
Av. br.	**cm.**	**4.2**		
Av. t.	**mm.**	**8.3**		
Av. proportion		**2.4**		
Extremes.				
Max. l.	**cm.**	**12.5**		
Min. l.	**cm.**	**6.0**		
Max. br.	**cm.**	**6.0**		
Min. br.	**cm.**	**3.0**		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			2	
2 cve.			0	
2 fl.			4	
2 cx.			0	
Irr.			0	
U.			0	6
Where from.				
Del.			1	
Mass.			1	
N. Y.			2	
O.			1	
Pa.			1	6

Perforations.		**6**
Specimens w. 0 perf.	**2**	
“ “ 1 “	0	
“ “ 2 “	**4**	
“ “ 3 “	0	**6**
Countersinking.		
Specimens w. perfs. ck. 1 f.	0	
“ “ “ **ck. 2 ff.**	**4**	
“ “ “ **not ck.**	0	
“ “ **cking. irr.**	0	**4**
Specimens w. larger diam. **cve. f.**	0	
“ “ “ “ **fl. f.**	1	
“ “ “ “ cx. f.	0	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	0	
“ “ **no** “ “ or		
“ “ “ “ n. s.	3	**4**
Position.		
Of the specimens with 1 perf.		
Perf. near cen.		
“ “ end		
Of the specimens w. 2 perfs.	0	
Perfs. near cen.	2	
“ “ end	2	
“ “ equid.	0	**4**
Wearing. (Perfs.)		
Specimens worn	0	
“ not “		
w. wearing n. s.	4	**4**

PEABODY MUSEUM. CLASS 7. EXPANDED AT MIDDLE.

Specimens No.				7
Material. Limest.			1	
Slate			3	
Slate (B)			3	7
Av. l.	cm.	11.1		
Av. br.	cm.	4.3		
Av. t.	mm.	15.9		
Av. proportion		2.6		
Extremes.				
Max. l.	cm.	14.0		
Min. l.	cm.	9.5		
Max. br.	cm.	5.0		
Min. br.	cm.	3.5		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			6	
2 cve.			0	
2 fl.			0	
2 cx.			1	
Irr.			0	
U.			0	7
Where from.				
Ky			1	
O.			5	
W Va			1	7

Perforations.		
Specimens w. 0 perf.	3	
" " 1 "	0	
" " 2 "	4	
" " 3 "	0	7
Countersinking.		
Specimens w. perfs. ck. 1 f.	3	
" " " ck. 2 ff.	1	
" " " not ck.	0	
" " cking. irr.	0	4
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	3	
" " " " cx. f.	0	
" " " " lower f.	0	
" " " " upper f.	0	
" " no " " or	0	
" " " " n. s.	1	4
Position.		
Specimens w. 1 perf.		
Perf. near cen.		
" " end		
Specimens w. 2 perfs.		
Perfs. near cen.	3	
" " end	0	
" equid.	1	4
Wearing. (Perfs.)		
Specimens worn	3	
" not " , or		
w. wearing n. s.	1	4

PEABODY MUSEUM. CLASS 8. SHIELD-SHAPED.

Specimens No.			8
Material. Copper.		2	
Slate		4	
Slate (B)		2	8
Av. l.	cm.	11.3	
Av. br.	cm.	5.9	
Av. t.	mm.	7.9	
Av. proportion		1.92	
Extremes.			
Max. l.	cm.	16.5	
Min. l.	cm.	8.0	
Max. br.	cm.	12.0	
Min. br.	cm.	3.5	
Faces. Specimens w.			
1 cve. 1 fl.		0	
1 cve. 1 cx.		0	
1 fl. 1 cx.		1	
2 cve.		0	
2 fl.		7	
2 cx.		0	
Irr.		0	
U.		0	8
Where from.			
Ky.		6	
O.		2	8

Perforations.		
Specimens w. 0 perf.	1	
“ “ 1 “	6	
“ “ 2 “	1	
“ “ 3 “	0	8
Countersinking.		
Specimens w. perfs. ck. 1 f.	0	
“ “ “ ck. 2 ff.	5	
“ “ “ not ck.	2	
“ “ cking irr.	0	7
Specimens w. larger diam. cve. f.	0	
“ “ “ “ fl. f.	0	
“ “ “ “ cx. f.	0	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	0	
“ “ no “ “ or		
“ “ “ “ n. s.	7	7
Position.		
Specimens w. 1 perf.		
Perf. near cen.	2	
“ “ end	4	6
Specimens w. 2 perfs.		
Perfs. near cen.	1	
“ “ end	0	
“ “ equid.	0	1
Wearing. (Perfs.)		
Specimen worn	0	
“ not “ , or		
w. wearing n. s.	7	7

PEABODY MUSEUM. CLASS 7. EXPANDED AT MIDDLE.

Specimens No.				7	Perforations.		
Material. Limest.			1		Specimens w. 0 perf.	3	
Slate			3		" " 1 "	0	
Slate (B)			3	7	" " 2 "	4	
					" " 3 "	0	7
Av. l.	cm.	11.1			Countersinking.		
Av. br.	cm.	4.3			Specimens w. perfs. ck. 1 f.	3	
Av. t.	mm.	15.9			" " " ck. 2 ff.	1	
Av. proportion		2.6			" " " not ck.	0	
					" " cking. irr.	0	4
Extremes.					Specimens w. larger diam. cve. f.	0	
Max. l.	cm.	14.0			" " " " fl. f.	3	
Min. l.	cm.	9.5			" " " " cx. f.	0	
Max. br.	cm.	5.0			" " " " lower f.	0	
Min. br.	cm.	3.5			" " " " upper f.	0	
					" " no " " or	0	
					" " " " n. s.	1	4
Faces. Specimens w.							
1 cve. 1 fl.			0		Position.		
1 cve. 1 cx.			0		Specimens w. 1 perf.		
1 fl. 1 cx.			6		Perf. near cen.		
2 cve.			0		" " end		
2 fl.			0				
2 cx.			1		Specimens w. 2 perfs.		
Irr.			0		Perfs. near cen.	3	
U.			0	7	" " end	0	
					" equid.	1	4
Where from.					Wearing. (Perfs.)		
Ky.			1		Specimens worn	3	
O.			5		" not " , or		
W. Va.			1	7	w. wearing n. s.	1	4

PEABODY MUSEUM. CLASS 9. B. PENDANTS. RECTANGULAR.

Specimens No.				9
Material. Sandstone			1	
Slate			7	
Slate (B)			1	9
Av. l.	cm.	8.3		
Av. br.	cm.	2.8		
Av. t.	mm.	6.4		
Av. proportion		2.2		
Extremes.				
Max. l.	cm.	11.0		
Min. l.	cm.	3.5		
Max. br.	cm.	6.0		
Min. br.	cm.	3.0		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			1	
1 fl. 1 cx.			0	
2 cve.			0	
2 fl.			6	
2 cx.			1	
Irr.			0	
U.			1	9
Where from.				
Ky.			2	
Mass.			1	
O.			2	
N. J.			1	
N. Y.			1	
Va.			1	
W. Va.			1	9

Perforations.		
Specimens w. 0 perf.	0	
“ “ 1 “	6	
“ “ 2 “	1	
“ “ 3 “	1	
“ “ 5 “	1	9
Countersinking.		
Specimens w. perfs. ck. 1 f.	0	
“ “ “ ck. 2 ff.	6	
“ “ “ not ck.	1	
“ “ cking. irr.	2	9
Specimens w. larger diam. cve. f.	0	
“ “ “ “ fl. f.	0	
“ “ “ “ cx. f.	0	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	0	
“ “ no “ “ or		
“ “ “ “ n. s.	9	9
Position.		
Specimens w. 1 perf.		
Perf. near cen.	0	
“ “ end	6	6
Specimens w. 2 perfs.		
Perfs. near cen.	0	
“ “ end (corners)	1	
“ equid.	0	1
Wearing. (Perfs.)		
Specimens worn	2 spec	
“ not “ , or		
w. wearing n. s.	7	9

PEABODY MUSEUM. CLASS 9. A. PENDANTS.
CELT-SHAPED.

Specimens No.				25
Material.	Coal		1	
	Diabase		1	
	Hematite		1	
	Slate		17	
	Slate (B)		1	
	Steatite		1	
	U.		3	25
Av. l.	cm.	9.5		
Av. br.	cm.	4.5		
Av. t.	mm.	9.9		
Av. proportion		2.1		
Extremes.				
Max. l.	cm.	17.0		
Min. l.	cm.	4.5		
Max. br.	cm.	8.0		
Min. br.	cm.	3.0		

Faces. Specimens w.		
1 cve. 1 fl.	0	
1 cve. 1 cx.	0	
1 fl. 1 cx.	2	
2 cve.	10	
2 fl.	13	
2 cx.	0	
Irr.	0	
U.	0	25

Where from.				
Ala.	1	N. J.	3	
Ark.	1	N. Y.	1	
Ind.	1	Pa.	2	
Ky.	2	Tenn.	2	
Mass.	6	Va.	1	
O.	3	W. Va.	2	
	14	+	11	25

Perforations.		
Specimens w. 0 perf.	1	
“ “ 1 “	22	
“ “ 2 “	2	
“ “ 3 “	0	25
Countersinking.		
Specimens w. perfs. ck. 1 f.	3	
“ “ “ ck. 2 ff.	20	
“ “ “ not ck.	1	
“ “ cking. irr.	0	24
Specimens w. larger diam. cve. f.	0	
“ “ “ “ fl. f.	0	
“ “ “ “ cx. f.	1	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	0	
“ “ no “ “ or		
“ “ “ “ n. s.	23	24
Position.		
Specimens w. 1 perf.		
Perf near cen.	1	
“ “ end	21	22
Specimens with 2 perfs.		
Perfs. near cen.	0	
“ “ end	2	
“ equid.	0	2
Wearing. (Perfs.)		
Specimens worn	3	
“ not “ , or		
w. wearing n. s.	21	24

PEABODY MUSEUM. SUMMARY OF CLASSES 1–9 INCL.

Specimens No.				120
Material.		Quartzite	2	
		Sandstone	1	
Bone	5	Schist	1	
Coal	3	Slate	60	
Copper	1	Slate (B)	23	
Diabase	1	Soapstone	5	
Gypsum	1	Steatite	7	
Hematite	1	Syenite	1	
Limestone	3	U.	5	
	15	+	105	120

Av. l.	cm.	9.680
Av. br.	cm.	4.373
Av. t.	mm.	10.407
Av. proportion		2.2136

Extremes.			Class
Max. l	cm.	17.0	5C. 9A.
Min. l	cm.	3.5	9B.
Max. br.	cm.	12.0	8
Min. br.	cm.	2.	3 4

Faces. Specimens w.		
1 cve. 1 fl.	0	
1 cve. 1 cx.	11	
1 fl. 1 cx.	29	
2 cve.	0	
2 fl.	57	
2 cx.	21	
Irr.	0	
U.	2	120

Where from.				
Ala.	1	N. J.	9	
Ark.	1	N. Y.	6	
Del.	1	O.	35	
Ind.	4	Pa.	4	
Ky.	11	Tenn.	3	
Mass.	11	Va.	2	
Mich.	5	W. Va.	27	
	34	+	86	120

Perforations.		
Specimens w. 0 perf.	11	
“ “ 1 “	54	
“ “ 2 “	49	
“ “ 3 “	5	
“ “ more than 3 perfs.	1	120
Specimens w. perfs. ck. 1 f.	17	
“ “ “ “ 2 ff.	81	
“ “ “ not “	8	
“ “ cking. irr.	3	109
Specimens w. larger diam. cve. f.	4	
“ “ “ “ fl. f.	13	
“ “ “ “ cx. f.	7	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	0	
“ “ no “ “ or		
“ “ “ “ n. s.	85	109
Position.		
Specimens w. 1 perf.		
Perf. near cen.	14	
“ “ end	40	54
Specimens w. 2 perf.		
Perf. near cen.	15	
“ “ end	20	
Specimens w. perf. equidistant	11	
“ “ “ irr.	3	49
		perf
Wearing of specimens with perfs.		19
Specimens worn	22	spec
“ not “ or		3
w. wearing n. s.	87	109
Proportion. Worn	20	.2%
Not “ or		
w. wearing n. s.	79	.8%
		=
		100

PEABODY MUSEUM. CLASS 9. C. PENDANTS.
OVAL OR CIRCULAR.

Specimens No.				6
Material. Quartzite			2	
Slate			1	
Slate (B)			1	
Syenite			1	
U.			1	
Av. l.	cm.	6.8		
Av. br.	cm.	4.8		
Av. t.	mm.	9.2		
Av. proportion		1.4		
Extremes.				
Max. l.	cm.	8.5		
Min. l.	cm.	5.0		
Max. br.	cm.	6.0		
Min. br.	cm.	3.5		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			0	
2 cve.			0	
2 fl.			5	
2 cx.			1	
Irr.			0	
U.			0	6
Where from.				
O.			2	
N. J.			3	
W. Va.			1	6

Perforations.		
Specimens w. 0 perf.	0	
“ “ 1 “	5	
“ “ 2 “	1	
“ “ 3 “	0	6
Countersinking.		
Specimens w. perfs. ck. 1 f.	3	
“ “ “ ck. 2 ff.	3	
“ “ “ not ck.	0	
“ “ cking irr.	0	6
Specimens w. larger diam. cve. f.	0	
“ “ “ “ fl. f.	2	
“ “ “ “ cx. f.	0	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	0	
“ “ no “ “ or		
“ “ “ “ n. s.	4	6
Position.		
Specimens w. 1 perf.		
Perf. near cen.	0	
“ “ end	5	5
Specimens w. 2 perfs.		
Perfs. near cen.	0	
“ “ end	0	
“ equid.	0	
“ irr.	1	1
Wearing. (Perfs.)		
Specimens worn	3	spec
“ not “ , or		
w. wearing n. s.	3	6

ANDOVER. CLASS 2. A. OVATE. SIDES CONCAVE.

Specimens No.				2
Material. Granite			1	
Slate (B)			1	2
Av. l.	cm.	8.90		
Av. br.	cm.	4.30		
Av. t.	mm.	8.		
Av. proportion		2 1		
Extremes.				
Max. l.	cm.	10.60		
Min. l.	cm.	7.20		
Max. br	cm.	5.00		
Min. br.	cm.	3.50		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			0	
2 cve.			0	
2 fl.			1	
2 cx.			1	
Irr.			0	
U.			0	2
Where from.				
Ind.			1	
O.			1	2

Perforations.		
Specimens w. 0 perf.	0	
" " 1 "	1	
" " 2 "	0	
" " 3 "	1	2
Countersinking.		
Specimens w. perfs. ck. 1 f.	1	
" " " ck. 2 ff.	0	
" " " not ck.	1	
" " cking. irr.	0	2
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	0	
" " " " cx. f.	0	
" " " " lower f.	0	
" " " " upper f.	1	
" " no " " or		
" " " " n. s.	1	2
Position.		
Specimens with 1 perf.		
Perf. near cen.	1	
" " end	0	1
Specimens w. 2 perfs.		
Perfs. near cen.	0	
" " end	0	
Wearing.		
Specimens worn		
" not " , or	0	
w. wearing n. s.	2	2

ANDOVER. CLASS. 1. SPADE-SHAPED.

Specimens No.				7
Material. Hematite			1	
Slate			3	
Slate (B)			3	7
Av. l.	cm.	9.90		
Av. br.	cm.	4.30		
Av t.	mm.	9.00		
Av. proportion		2.30		
Extremes.				
Max. l.	cm.	13.20		
Min. l.	cm.	7.90		
Max. br.	cm.	5.00		
Min. br.	cm.	3.20		
Faces. Specimens with				
1 cve. 1 fl.			0	
1 cv. 1 cx.			0	
1 fl. 1 cx.			1	
2 cve.			0	
2 fl.			4	
2 cx.			1	
Irr.			1	
U.			0	7
Where from.				
Ohio				7

Perforations.		
Specimens w. 0 perf.	0	
" " 1 "	5	
" " 2 "	2	
" " 3 "	0	7
Countersinking.		
Specimens w. perfs. ck. 1 f.	0	
" " " ck. 2 ff.	6	
" " " not ck.	1	
" " cking. irr.	0	7
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	0	
" " " " cx. f.	0	
" " " " lower f.	0	
" " " " upper f.	0	
" " no " " or		
" " " " n. s.	7	7
Position.		
Specimens w. 1 perf.		
Perf. near cen.	2	
" " end	3	5
Specimens w. 2 perfs.		
Perfs. near cen.		
" " end		
Specimens irr. or u.	2	2
Wearing.		
Specimens worn	1	
" not " , or		
w. wearing n. s.	6	7

ANDOVER. CLASS 2. A. OVATE. SIDES CONCAVE.

Specimens No.				
Material. Granite			1	
Slate (B)			1	2
Av. l.	cm.	8.90		
Av. br.	cm.	4.30		
Av. t.	mm.	8.		
Av. proportion		2.1		
Extremes.				
Max. l.	cm.	10.60		
Min. l.	cm.	7.20		
Max. br	cm.	5.00		
Min. br.	cm.	3.50		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			0	
2 cve.			0	
2 fl.			1	
2 cx.			1	
Irr.			0	
U.			0	2
Where from.				
Ind.			1	
O.			1	2

2 Perforations.		
Specimens w. 0 perf.	0	
" " 1 "	1	
" " 2 "	0	
" " 3 "	1	2
Countersinking.		
Specimens w. perfs. ck. 1 f.	1	
" " " ck. 2 ff.	0	
" " " not ck.	1	
" " cking. irr.	0	2
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	0	
" " " " cx. f.	0	
" " " " lower f.	0	
" " " " upper f.	1	
" " no " " or		
" " " " n. s.	1	2
Position.		
Specimens with 1 perf.		
Perf. near cen.	1	
" " end	0	1
Specimens w. 2 perfs.		
Perfs. near cen.	0	
" " end	0	
Wearing.		
Specimens worn		
" not " , or	0	
w. wearing n. s.	2	2

ANDOVER. CLASS 2. B. OVATE. SIDES IRREGULAR.

Specimens No.			5
Material. Granite		1	
Sandstone		2	
Slate		2	5
Av. l.	cm.	8.96	
Av. br.	cm.	4.14	
Av. t.	mm.	9.20	
Av. proportion		2.10	
Extremes.			
Max. l.	cm.	10.40	
Min. l.	cm.	5.70	
Max. br.	cm.	5.80	
Min. br.	cm.	2.80	
Faces. Specimens w.			
1 cve. 1 fl.		0	
1 cve. 1 cx.		0	
1 fl. 1 cx.		1	
2 cve.		0	
2 fl.		2	
2 cx.		0	
Irr.		0	
U.		2	5
Where from.			
Ind.		1	
O.		4	5

Perforations.		
Specimens w. 0 perf.	0	
“ “ 1 “	3	
“ “ 2 “	2	
“ “ 3 “	0	5
Countersinking.		
Specimens w. perfs. ck. 1 f.	0	
“ “ “ ck. 2 ff.	2	
“ “ “ not ck.	2	
“ “ cking irr.	1	5
Specimens w. larger diam. cve. f.	0	
“ “ “ “ fl. f.	0	
“ “ “ “ cx. f.	0	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	1	
“ “ no “ “ or		
“ “ “ “ n. s.	4	5
Position.		
Specimens w. 1 perf.		
Perf. near cen.	3	
“ “ end	0	3
Specimens w. 2 perfs.		
Perfs. near cen.	2	
“ “ end	0	2
Wearing.		
Specimen worn	1	
“ not “ , or		
w. wearing n. s.	4	5

ANDOVER. CLASS 2. C. OVATE. SIDES CONVEX.

Specimens No.		39
Material. Granite	2	
Greenstone	1	
Mica schist	1	
Sandstone	11	
Shale	7	
Slate	7	
Slate (B)	9	
Syenite	1	39

Av. l.	cm.	9.76
Av. br.	cm.	4.36
Av. t.	mm.	9.90
Av. proportion		2.20
Extremes.		
Max. l.	cm.	18.90
Min. l.	cm.	6.30
Max. br.	cm.	6.30
Min. br.	cm.	2.80

Faces. Specimens w.		
1 cve. 1 fl.	0	
1 cve. 1 cx.	0	
1 fl. 1 cx.	11	
2 cve.	0	
2 fl.	15	
2 cx.	11	
Irr.	2	
U.	0	39
Where from.		
Ind.	7	
O.	30	
Tenn.	2	39

Perforations.		
Specimens w. 0 perf.	9	
" " 1 "	14	
" " 2 "	16	
" " 3 "	0	39
Countersinking.		
Specimens w. perfs. ck. 1 f.	8	
" " " ck. 2 ff.	18	
" " " not ck.	3	
" " cking. irreg.	1	30
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	1	
" " " " cx. f.	0	
" " " " lower f.	5	
" " " " upper f.	10	
" " no " " or		
" " " " n. s.	14	30
Position.		
Specimens w. 1 perf.		
Perf. near cen.	5	
" " end	8	
U.	1	14
Specimens w. 2 perfs.		
Perfs. near cen.	5	
" " end	8	
Specimens w. 2 perfs. irr.	3	16
Wearing.		
Specimens worn.	0	
" not " , or		
w. wearing n. s.	39	39

ANDOVER. CLASS. 3. LEAF-SHAPED.

Specimens No.			8
Material. Sandstone		3	
Shale		1	
Slate		2	
U.		2	8
Av. l.	cm.	10.21	
Av. br.	cm.	3.16	
Av t.	mm.	9.00	
Av. proportion		3.20	
Extremes.			
Max. l.	cm.	14.20	
Min. l.	cm.	7.00	
Max. br.	cm.	4.50	
Min. br.	cm.	1.70	
Faces. Specimens with			
1 cvc. 1 fl.		0	
1 cvc. 1 cx.		0	
1 fl. 1 cx.		3	
2 cvc.		0	
2 fl.		2	
2 cx.		2	
Irr.		1	
U.		0	8
Where from.			
Fla.		1	
Ohio		7	8

Perforations.		
Specimens w. 0 perf.	6	
" " 1 "	2	
" " 2 "	0	
" " 3 "	0	8
Countersinking.		
Specimens w. perfs. ck. 1 f.	1	
" " " ck. 2 ff.	1	
" " " not ck.	0	
" " cking. irr.	0	2
Specimens w. larger diam. cvc. f.	0	
" " " " fl. f.	0	
" " " " cx. f.	0	
" " " " lower f.	1	
" " " " upper f.	1	
" " no " " or		
" " " " n. s.	0	2
Position.		
Specimens w. 1 perf.		
Perf. near cen.	2	
" " end	0	2
Specimens w. 2 perfs.		
Perfs. near cen.	0	
" " end	0	0
Wearing.		
Specimens worn	0	
" not " , or		
w. wearing n. s.	8	8

ANDOVER. CLASS 4. SPEAR-SHAPED.

Specimens No.				12
Material.	Sandstone		2	
	Shale		2	
	Slate		2	
	Slate (B)		5	
	U.		1	12
Av. l.	cm.	11.90		
Av. br.	cm.	5.10		
Av. t.	mm.	10.00		
Av. proportion		2.30		
Extremes.				
Max. l.	cm.	19.00		
Min. l.	cm.	7.50		
Max. br.	cm.	6.70		
Min. br.	cm.	3.70		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			1	
2 cve.			0	
2 fl.			9	
2 cx.			2	
Irr.			0	
U.			0	12
Where from.				
Ills.			1	
Ind.			4	
O.			7	12

Perforations.		
Specimens w. 0 perf.	2	
“ “ 1 “	5	
“ “ 2 “	5	
“ “ 3 “	0	12
Countersinking.		
Specimens w. perfs. ck. 1 f.	4	
“ “ “ ck. 2 ff.	5	
“ “ “ not ck.	1	
“ “ cking irr.	0	10
Specimens w. larger diam. cve. f.	0	
“ “ “ “ fl. f.	0	
“ “ “ “ cx. f.	0	
“ “ “ “ lower f.	0	
“ “ “ “ upper f.	4	
“ “ no “ “ or		
“ “ “ “ n. s.	6	10
Position.		
Specimens w. 1 perf.		
Perf. near cen.	0	
“ “ end	5	5
Specimens w. 2 perfs.		
Perfs. near cen.	0	
“ “ end	1	
“ irr. or u.	4	5
Wearing.		
Specimens worn	1	
“ not “ , or		
w. wearing n. s.	11	12

ANDOVER. CLASS 5. A. RECTANGULAR. SIDES CONCAVE.

Specimens No.				16
Material. Sandstone			2	
Shale			1	
Slate			9	
Slate (B)			4	16
Av. l.	cm.	9.50		
Av. br.	cm.	5.30		
Av. t.	mm.	9.20		
Av. proportion		1.79		
Extremes.				
Max. l.	cm.	13.50		
Min. l.	cm.	7.50		
Max. br.	cm.	8.70		
Min. br.	cm.	3.80		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			1	
2 cve.			0	
2 fl.			10	
2 cx.			2	
Irr. U.			3	16
Where from.				
Ind.			1	
O.			14	
Tenn.			1	16

Perforations.		
Specimens w. 0 perf.	6	
" " 1 "	3	
" " 2 "	7	
" " 3 "	0	16
Countersinking.		
Specimens w. perfs. ck. 1 f.	5	
" " " ck. 2 ff.	4	
" " " not ck.	0	
" " cking. irr.	1	10
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	0	
" " " " cx. f.	0	
" " " " lower f.	3	
" " " " upper f.	2	
" " no " " or	0	
" " " " n. s.	5	10
Position.		
Specimens w. 1 perf.		
Perf. near cen.	3	
" " end	0	3
Specimens w. 2 perfs.		
Perfs. near cen.	6	
" " end	0	
" irr or u.	1	
Wearing.		
Specimens worn	0	
" not " , or		
w. wearing n. s.	16	18

ANDOVER. CLASS 5. B. RECTANGULAR. SIDES STRAIGHT.

Specimens No.			37
Material. Coal (Cannel)		1	
Granite		1	
Limestone		1	
Sandstone		5	
Shale		5	
Slate		19	
Slate (B)		4	
Steatite		1	37
Av. l.	cm.	9.70	
Av. br.	cm.	4.00	
Av. t.	mm.	7.70	
Av. proportion		2.40	
Extremes.			
Max. l.	cm.	17.80	
Min. l.	cm.	4.70	
Max. br.	cm.	5.70	
Min. br.	cm.	1.30	
Faces. Specimens w.			
1 eve. 1 fl.		0	
1 eve. 1 ex.		0	
1 fl. 1 ex.		6	
2 eve.		0	
2 fl.		29	
2 ex.		1	
Irr. / U.		1	37
Where from.			
Ind.		6	
O.		30	
N. Y.		1	37

Perforations.		
Specimens w. 0 perf.	4 (3 un-fin.)	
" " 1 "	18	
" " 2 "	11	
" " 3 "	4	37
Countersinking.		
Specimens w. perfs. ck. 1 f.	3	
" " " ck. 2 ff.	21	
" " " not ck.	7	
" " cking. irr.	2	33
Specimens w. larger diam. eve. f.	0	
" " " " fl. f.	2	
" " " " ex. f.	0	
" " " " lower f.	3	
" " " " upper f.	13	
" " no " " or " " " " n. s.	15	33
Position.		
Specimens w. 1 perf.		
Perf. near cen.	7	
" " end	11	18
Specimens w. 2 perfs.		
Perfs. near cen.	6	
" " end	4	
" irr. or u.	1	11
Wearing.		
Specimens worn	4	
" not " , or w. wearing n. s.	33	37

ANDOVER. CLASS 5. C. RECTANGULAR. SIDES CONVEX.

Specimens No.			28
Material.	Granite	1	
	Greenstone	1	
	Limestone	1	
	Sandstone	6	
	Shale	3	
	Slate	13	
	Slate (B)	2	
	U.	1	28
Av. l.	cm.	9.71	
Av. br.	cm.	4.08	
Av. t.	mm.	8.64	
Av. proportion		2.40	
Extremes.			
Max. l.	cm.	16.50	
Min. l.	cm.	5.40	
Max. br.	cm.	5.10	
Min. br.	cm.	3.20	
Faces. Specimens w.			
1 cve. 1 fl.		0	
1 cve. 1 cx.		0	
1 fl. 1 cx.		8	
2 cve.		0	
2 fl.		17	
2 cx.		3	
Irr.		0	
U.		0	28
Where from.			
Ind.		4	
O.		23	
N. Y.		1	28

Perforations.		
Specimens w. 0 perf.	3	
" " 1 "	9	
" " 2 "	12	
" " 3 "	4	28
Countersinking.		
Specimens w. perfs. ck. 1 f.	7	
" " " ck. 2 ff.	12	
" " " not ck.	3	
" " cking. irr.	3	25
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	1	
" " " " cx. f.	1	
" " " " lower f.	1	
" " " " upper f.	6	
" " no " " or		
" " " " n. s.	16	25
Position.		
Specimens w. 1 perf.		
Perf. near cen.	2	
" " end	7	9
Specimens with 2 perfs.		
Perfs. near cen.	5	
" " end	6	
" irr. or u.	1	12
Wearing.		
Specimens worn	0	
" not " , or		
w. wearing n. s.	28	28

ANDOVER. CLASS 6. RIDGED.

Specimens No.			20
Material.	**Granite**	2	
	Sandstone	5	
	Sandstone (B)	1	
	Shale	2	
	Slate	3	
	Slate (B)	6	
	U.	1	20

Av. l.	cm.	10.37
Av. br.	cm.	4.11
Av. t.	mm.	20.10
Av. proportion		2.50
Extremes.		
Max. l.	cm.	14.30
Min. l.	cm.	5.70
Max. br.	cm.	5.40
Min. br.	cm.	2.20

Faces. Specimens w.		
1 cve. 1 fl.	0	
1 cve. 1 cx.	0	
1 fl. 1 cx.	18	
2 cve.	0	
2 fl.	0	
2 cx.	0	
Irr. **U.**	2	20

Where from.		
Ind.	1	
O.	17	
W. Va.	2	20

Perforations.		
Specimens w. 0 perf. (5 u.)	8	
" " 1 "	0	
" " 2 "	12	
" " 3 "	0	20

Countersinking.		
Specimens w. perfs. ck. 1 f.	7	
" " " ck. 2 ff.	2	
" " " not ck.	1	
" " cking. irr.	2	12

Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	2	
" " " " cx. f.	0	
" " " " lower f.	4	
" " " " upper f.	3	
" " no " " or		
" " " " n. s.	3	12

Position.		
Specimens w. 1 perf.		
Perf. near cen.	0	
" " end	0	0
Specimens w. 2 perfs.		
Perfs. near cen.	8	
" " end	4	
" irr. or u.	0	12

Wearing.		
Specimens worn	2	
" not " , or		
w. wearing n. s.	18	20

ANDOVER. CLASS 7. EXPANDED AT MIDDLE.

Specimens No.				15	Perforations.		
Material. Claystone			1		Specimens w. 0 perf. (6 unfin.)	9	
Mica schist			1		" " 1 "	1	
Sandstone			1		" " 2 "	5	
Shale			1		" " 3 "	0	15
Slate			6				
Slate (B)			5	15	Countersinking.		
					Specimens w. perfs. ck. 1 f.	4	
Av. l.	cm.	11.50			" " " ck. 2 ff.	1	
Av. br.	cm.	4.30			" " " not ck.	0	
Av. t.	mm.	11.20			" " cking. irr.	1	6
Av. proportion		2.70					
					Specimens w. larger diam. cve. f.	0	
Extremes.					" " " " fl. f.	0	
Max. l.	cm.	15.80			" " " " cx. f.	0	
Min. l.	cm.	7.10			" " " " lower f.	1	
Max. br.	cm.	5.10			" " " " upper f.	3	
Min. br.	cm.	3.50			" " no " " or		
					" " " " n. s.	2	6
Faces. Specimens w.							
1 cve. 1 fl.			0		Position.		
1 cve. 1 cx.			0		Specimens w. 1 perf.		
1 fl. 1 cx.			9		Perf. near cen.	0	
2 cve.			0		" " end	1	1
2 fl.			5				
2 cx.			0		Specimens with 2 perfs.		
Irr.			0		Perfs. near cen.	3	
U.			1	15	" " end	2	
					" irr. or u.	0	5
Where from.							
Ind.			1		Wearing.		
Mich.			1		Specimens worn	0	
New England			1		" not " , or		
O.			12	15	w. wearing n. s.	15	15

ANDOVER. CLASS 8 SHIELD-SHAPED.

Specimens No.			20
Material.	**Sandstone**	2	
	Shale	1	
	Slate	4	
	Slate (B)	13	20

Av. l.	cm.	10.22
Av. br.	cm.	5.85
Av. t.	mm.	9.50
Av. proportion		1.75
Extremes.		
Max. l.	cm.	12.00
Min. l.	cm.	8.10
Max. br.	cm.	8.20
Min. br.	cm.	4.50

Faces. Specimens w.		
1 cve. 1 fl.	0	
1 cve. 1 cx.	0	
1 fl. 1 cx.	3	
2 cve.	0	
2 fl.	9	
2 cx.	8	
Irr.	0	
U.	0	20

Where from.		
Ind.	3	
Ky.	1	
N. Y.	1	
O.	15	20

Perforations.		
Specimens w. 0 perf. (2 unfin.)	2	
" " 1 "	15	
" " 2 "	2	
" " 3 "	1	20

Countersinking.		
Specimens w. perfs. ck. 1 f.	4	
" " " ck. 2 ff.	13	
" " " not ck.	0	
" " cking. irr.	1	18

Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	0	
" " " " cx. f.	0	
" " " " lower f.	0	
" " " " upper f.	7	
" " no " " or " " " " n. s.	11	18

Position.		
Specimens with 1 perf.		
Perf. near cen.	7	
" " end	8	15
Specimens w. 2 perfs.		
Perfs. near cen.	2	
" " end	0	
" irr. or u.	0	2

Wearing.		
Specimens worn	0	
" not " , or w. wearing n. s.	18	18

ANDOVER. CLASS 9. A. PENDANTS. CELT-SHAPED.

Specimens No.				31
Material. Coal (cannel)			2	
Granite			3	
Sandstone			3	
Sandstone (B)			1	
Shale			6	
Slate			9	
Slate (B)			7	31
Av. l.	cm.	8.91		
Av. br.	cm.	4.59		
Av. t.	mm.	8.45		
Av. proportion		1.94		
Extremes.				
Max. l.	cm.	17.60		
Min. l.	cm.	3.40		
Max. br.	cm.	7.20		
Min. br.	cm.	2.80		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			7	
2 cve.			0	
2 fl.			15	
2 cx.			9	
Irr.			0	
U.			0	31
Where from.				
Ariz.			1	
Ills.			1	
Ind.			7	
Ky.			1	
O.			20	
W. Va.			1	31

Perforations.		
Specimens w. 0 perf.	3	
" " 1 "	27	
" " 2 "	1	
" " 3 "	0	31
Countersinking.		
Specimens w. perfs. ck. 1 f.	1	
" " " ck. 2 ff.	23	
" " " not ck.	4	
" " cking. irr.	0	28
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	1	
" " " " cx. f.	0	
" " " " lower f.	0	
" " " " upper f.	3	
" " no " " or		
" " " " n. s.	24	28
Position.		
Specimens w. 1 perf.		
Perf. near cen.	4	
" " . end	23	27
Specimens w. 2 perfs.		
Perfs. near cen.	0	
" " end	0	
" irr. or u.	1	1
Wearing.		
Specimens worn	4	
" not " , or		
w. wearing n. s.	27	31

ANDOVER. CLASS 9. B. PENDANTS. RECTANGULAR.

Specimens No.				6
Material. Granite			1	
Sandstone			1	
Slate			2	
Slate (B)			2	6
Av. l.	cm.	7.35		
Av. br.	cm.	3.62		
Av. t.	mm.	7.00		
Av. proportion		2.03		
Extremes.				
Max. l.	cm.	10.00		
Min. l.	cm.	5.30		
Max. br.	cm.	5.60		
Min. br.	cm.	2.50		
Faces. Specimens w.				
1 cve. 1 fl.			0	
1 cve. 1 cx.			0	
1 fl. 1 cx.			0	
2 cve.			0	
2 fl.			5	
2 cx.			1	
Irr.			0	
U.			0	6
Where from.				
O.			6	6

Perforations.		
Specimens w. 0 perf.	0	
" " 1 "	6	
" " 2 "	0	
" " 3 "	0	6
Countersinking.		
Specimens w. perfs. ck. 1 f.	0	
" " " ck. 2 ff.	4	
" " " not ck.	2	
" " cking. irr.	0	6
Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	0	
" " " " cx. f.	0	
" " " " lower f.	0	
" " " " upper f.	2	
" " no " " or	0	
" " " " n. s.	4	6
Position.		
Specimens w. 1 perf.		
Perf. near cen.	1	
" " end	5	6
Specimens w. 2 perfs.		
Perfs. near cen.	0	
" " end	0	
" irr or u.	0	0
Wearing.		
Specimens worn	0	
" not " , or		
w. wearing n. s.	6	6

ANDOVER. CLASS 9. C. PENDANTS. OVAL OR CIRCULAR.

Specimens No.				11	Perforations.		
Material. Diorite			3		Specimens w. 0 perf.	1	
Granite			1		" " 1 "	8	
Ironstone			1		" " 2 "	1	
Sandstone			3		" " 3 "	1	11
Slate			1				
Slate (B)			1		Countersinking.		
U.			1	11	Specimens w. perfs. ck. 1 f.	1	
					" " " ck. 2 ff.	6	
Av. l.	cm.	4.99			" " " not ck.	3	
Av. br.	cm.	3.15			" " cking irr.	0	10
Av. t.	mm.	5.80					
Av. proportion		1.58			Specimens w. larger diam. cve. f.	0	
					" " " " fl. f.	0	
Extremes.					" " " " cx. f.	6	
Max. l.	cm.	8.70			" " " " lower f.	0	
Min. l.	cm.	3.00			" " " " upper f.	2	
Max. br.	cm.	4.00			" " no " " or		
Min. br.	cm.	1.60			" " " " n. s.	8	10
Faces. Specimens w.					Position.		
1 cve. 1 fl.			0		Specimens w. 1 perf.		
1 cve. 1 cx.			0		Perf. near cen.	1	
1 fl. 1 cx.			1		" " end or edge	7	8
2 cve.			0				
2 fl.			4		Specimens w. 2 perfs.		
2 cx.			3		Perfs. near cen.	0	
Irr. {			3	11	" " end	1	
U. }					" irr. or u.	0	1
Where from.					Wearing.		
Canada			1		Specimens worn	0	
Ind.			3		" not " , or		
O.			7	11	w. wearing n. s.	11	11

ANDOVER. SUMMARY OF ALL CLASSES EXCEPT 10.

Specimens No.				
Material.		Sandstone	46	
Coal (cannel)	3	Sandstone (B)	2	
Claystone	1	Schist	2	
Diorite	3	Shale	29	
Granite	13	Slate	82	
Greenstone	2	Slate (B)	62	
Hematite	1	Steatite	1	
Ironstone	1	Syenite	1	
Limestone	2	U.	6	
	26	+	231	257

Av. l.	cm.	9.4587
Av. br.	cm.	4.2907
Av. t.	cm.	9.5133
Av. proportion		2.2050

Extremes.			Class
Max. l.	cm.	19.00	(4)
Min. l.	cm.	3.00	(9. C.)
Max. br.	cm.	8.70	(5. A.)
Min. br.	cm.	1.30	(5. B.)

Faces. Specimens w.		
1 cve. 1 fl.	0	
1 cve. 1 cx.	0	
1 fl. 1 cx.	70	
2 cve.	0	
2 fl.	127	
2 cx.	44	
Irr. } U. }	16	257

Where from.				
Ariz.	1	Mich.	1	
Can.	1	N. E.	1	
Fla.	1	N. Y.	3	
Ill.	2	O.	200	
Ind.	39	Tenn.	3	
Ky.	2	W. Va.	3	
	46	+	211	257

257 Perforations.		
Specimens w. 0 perf.	53	
" " 1 "	117	
" " 2 "	76	
" " 3 "	11	257

Countersinking.		
Specimens w. perfs. ck. 1 f.	46	
" " " " 2 ff.	118	
" " "not"	28	
" " cking. irr. or u.	12	204

Specimens w. larger diam. cve. f.	0	
" " " " fl. f.	7	
" " " " cx. f.	1	
" " " " lower f.	18	
" " " " upper f.	58	
" " no " " or " " " " n. s.	120	204

Position.		
Specimens w. 1 perf.		
Perf. near cen.	38	
" " end	77	
Specimens w. perf. irr. or u.	2	117

Specimens w. 2 perfs.		
Perfs. near cen.	37	
" " end	26	
Specimens w. perfs. irr. or u.	13	76

Wearing.		
Specimens worn	15	
" not " , or w. wearing n. s.	242	257

Proportion.

Specimens worn 5.8366%.

" not " 94.1634%.

NUMBER OF SPECIMENS.

Class.				Total.	Class.
1.	Cambridge.	5			1.
	Andover.		7	12	
2. A.	Cambridge.	3			2. A.
	Andover.		2	5	
2. B.	Cambridge.	7			2. B.
	Andover.		5	12	
2. C.	Cambridge.	13			2. C.
	Andover.		39	52	
3.	Cambridge.	6			3.
	Andover.		8	14	
4.	Cambridge.	5			4.
	Andover.		12	17	
5. A.	Cambridge.	8			5. A.
	Andover.		16	24	
5. B.	Cambridge.	6			5. B.
	Andover.		37	43	
5. C.	Cambridge.	10			5. C.
	Andover.		28	38	
6.	Cambridge.	2			6.
	Andover.		20	22	
7.	Cambridge.	7			7.
	Andover.		15	22	
8.	Cambridge.	8			8.
	Andover.		20	28	
9. A.	Cambridge.	25			9. A.
	Andover.		31	56	
9. B.	Cambridge.	9			9. B.
	Andover.		6	15	
9. C.	Cambridge.	6			9. C.
	Andover		11	17	
	Total Cambridge.	120			
	" Andover.		257	377	
10.	Cambridge.	6			10.
	Andover.		25	31	
	Total with Class 10. Cambridge.	126			
	" " " ", Andover.		282	408	
2.	Entire. Cambridge.	23			2.
	Andover.		46	69	
5.	" Cambridge.	24			5.
	Andover.		81	105	
9.	" Cambridge.	40			9.
	Andover.		48	88	

DISCUSSION OF THE TABLES.

NUMBER OF SPECIMENS.

In the subjoined table may be seen the number of specimens in each class at Cambridge and Andover respectively.

Of these classes, Nos. 1 (spade-shaped), 2 (ovate), 3 (leaf-shaped), 7 (expanded at middle), and 8 (shield-shaped) are characteristic and easily separated from each other, from the remaining classes and from other specimens.

Class 4 (spear-shaped) presents a hazy line of demarcation when compared with various implements pointed at one end; Class 5 (rectangular) is difficult to distinguish from stone tablets of various uses not connected with "gorgets"; Class 6 (ridged) is similar to the so-called "boat-stones", and Class 9 (pendants) is merely a somewhat arbitrary grouping together of objects that may have been suspended as throat or breast ornaments, and are hardly to be ruthlessly separated from the hundreds of other pendants, and suspended ornaments that abound at all times and in all places.

The subdivisions in Classes 2, 5 and 9 are clearly marked, and a study of "gorget" forms is as convincing that variations of concave, straight and convex lines were directly planned by the Indian artisans as is a study of their projectile points.[18]

The number in the "gorget" class is small relatively to the numbers in the collections. In Cambridge, 126 specimens represent a collection of hundreds of thousands of numbered objects, and in Andover, out of a collection of 60,000 individuals, there are but 282 specimens of "gorgets".

There are, however, fragments in both collections whose properties are sometimes of importance. "Gorgets" and "gorget"-pendants are not infrequent when compared to the numbers of "bird-stones", "boat-stones" and "bar-amulets". They, with the variations of the "banner-stone", are the most commonly met with. The care with which they were made is apparent when the number in Class 5 is noticed. The largest single class, (all told) 105 specimens, has yet the condition to fulfill that the corners shall be more or less angular. Ease of workmanship in shaping the specimens would naturally have tended to augment Class 2 (ovate) at the expense of Class 5.

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[18] Cf. Peabody. "*Exploration of Mounds*", Coahoma Co., Miss. Peabody Mus. Papers, Vol. III, No. 2. pp. 40 ff. and Pl. XVIII.

The same tendency, away from concavity in favor of straightness or convexity of outline, is presented in the subdivisions of Classes 2 and 5, as in the classification of projectile points.[19] Finally, the comparative smallness of Class 10 is to be remarked. In Cambridge but 5 per cent., and in Andover 10 per cent. of the specimens refuse classification under the 15 regular headings.

MATERIAL.

The striking proportion of slate of various kinds used in the manufacture of "gorgets", may perhaps be explained by the prevalence of the stone and the ease of its manufacture.

The following table gives the proportion of slate "gorgets" to the whole number. There is added a compilation of the "gorgets" from the B. E. Collection.[20] The figures are taken from Fowke's tables, and do not include the non-tabulated specimens.

Cambridge Classes 1-9	Total number of specimens	120
	Total number of specimens of slate	83
	Proportion of slate specimens	69%
Andover Classes 1-9	Total number of specimens	257
	Total number of specimens of slate	144
	Proportion of slate specimens	56%
Washington	Total number of specimens	85
	Total number of specimens of slate	45
	Proportion of slate specimens (including argillite)	53%

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[19] Peabody. Op. Cit. Also shown to a less degree in somewhat dissimilar objects.

Peabody-Moorehead. *Exploration of Jacobs Cavern.* P. A. Bull. I. 1904. pp. 18 ff.

[20] Cf. Fowke. *Stone Art.* Rep. B. E. 13. 1891-'92. pp. 118 ff.

The proportions are large and uniform.

The proportion of specimens of banded slate is perhaps more significant in the first eight more truly "ceremonial" classes than in Class 9.

CAMBRIDGE :—

Specimens, classes (1–8)	80
Specimens, classes (1–8) of slate (B.)	20
Proportion, classes (1–8) of slate (B.)	25%

ANDOVER:—

Specimens, classes (1–8)	209
Specimens, classes (1–8) of slate (B.)	52
Proportion, classes (1–8) of slate (B.)	24.9%

CAMBRIDGE:—

Specimens, class (9)	40
Specimens, class (9) of slate (B.)	3
Proportion, class (9) of slate (B.)	7.5%

ANDOVER:—

Specimens, class (9)	48
Specimens, class (9) of slate (B.)	10
Proportion, class (9) of slate (B.)	20.8%

Two of the specimens with faces concave-convex were originally, in all probability, parts of vases. The rarity of hematite specimens (2 in a total of 377) is hard to explain.

DIMENSIONS. CLASSES 1–9.

The length, breadth and thickness of the specimens are surprisingly uniform. The collections in Cambridge and Andover differ considerably in provenance and character, yet the following figures show a close relation.

Cambridge:	Average length,	Cm.	9.6800
Andover:	Average length,	Cm.	9.4587
	Difference,	Cm.	0.2213
Cambridge:	Average breadth,	Cm.	4.3730
Andover:	Average breadth,	Cm.	4.2907
	Difference,	Cm.	0.0823
Cambridge:	Average thickness,	Mm.	10.4070
Andover:	Average thickness,	Mm.	9.5133
	Difference,	Mm.	0.8937

Here the variation in average lengths and breadths is less than 3 per cent. of either term compared, and in thickness less than 10 per cent. Consequently the variation in average proportions is small:

Cambridge:	Average proportion	2.2136
Andover:	Average proportion	2.2050
	Difference	0.0086

This is less than .4 of 1 per cent. of either term.

The proportion of 1 : 2.2 more or less, is to many minds pleasing, and there can be no incongruity in suggesting that a like proprotion obtains in many other forms. Crosses of all kinds, some pictorial compositions, door-ways, the ground-plan of the Parthenon approach the ratio; in many instances an added breadth will cause the observer to say "too wide" or *mutatis mutandis*, "too narrow".

The extremes of "gorgets" vary considerably from one another, but the limits are similar in the two collections.

Cambridge:	Length.	Max. and Min.	Cm.	17.0	3.5
Andover:	Length.	Max. and Min.	Cm.	19.0	3.0
Cambridge:	Breadth.	Max. and Min.	Cm.	12.0	2.0
Andover:	Breadth.	Max. and Min.	Cm.	8.7	1.3

FACES. CLASSES 1–9.

The difficulty of manufacture, or the non-desirability of concave faces, is seen that out of 359 specimens noted but 11 have one concave face, and none have faces either both concave or concave-flat. These 11 are 3 per cent. of the whole as against 50 per cent. which the "doctrine of chances" would allow.

If "gorgets" were intended to be worn upon the person a flat side would be more convenient for fastening. We find among the 359 specimens that 283 are provided with at least one flat face. This is 78 per cent. of the whole. The argument is, however, wholly negative.

WHERE FROM. CLASSES 1–9.

Considering the states of Michigan, Ohio, Indiana, Illinois, West Virginia, Kentucky, Tennessee and Arkansas, as included in the "middle West", we find that out of the 377 specimens

336 are from that section. This is 89 per cent. From Ohio alone come 235, or 62 per cent.

The *provenance* of "gorgets" is thus almost limited to the so-called "Mound-Builder" area, with an inclusion of the Huron Iroquois district and parts of the upper Mississippi valley.

PERFORATIONS.

Of the numerous specimens with no perforations many are unfinished, and of course in no case can it be determined that no perforations were intended. But there remain a considerable number of specimens to all appearances complete and completed, yet without perforation. What means of suspension, if necessary, was used, is doubtful.

Of the specimens with a single perforation 74 or 43 per cent are, as might be expected, in the pendant class (9). The typical "gorget" form then if such exists at all is found with two perforations. If the specimens were intended for suspension in a position other than perpendicular two points of support are more or less necessary.

Countersinking is very common and naturally for ease of boring the drill was run in in the great majority of cases from both sides. The percentage follows:

Specimens with perforations	313
Specimens with perforations. Ck.	277 = 88%
Specimens with perforations. Ck.	277
Specimens with perforations. Ck. 2 ff.	199 = 72%

LARGER DIAMETER OF PERFORATIONS.

A careful study of the countersinking of the specimens was entered into with a view of determining whether the broader end of the perforation coincided with the concave, flatter, "lower" or "inside" face of the specimens.

In the thick specimens such as those of Class 6 and Class 7 (ridged and expanded at middle) an impression existed that such was the case. In the two specimens of Class 6 in the Peabody Museum the larger diameter is upon the flat or concave face, and in three out of the four specimens with perforations in Class 7. But in the Andover collection in Class 6 out of 12 specimens, but 6 have the larger diameter upon the flat or "lower" face, and in Class 7 out of 6 specimens, but one is thus drilled.

The proportion where the larger diameter is either lacking or not significant is very large in both collections: as follows (except Cl. 10).

Cambridge the proportion is	78%
Andover the proportion is	59%

POSITION OF THE PERFORATIONS.

Of the specimens with one perforation those wherein it approaches the end may more properly be classed as pendants than true "gorgets"; the proportion of such "gorget"-pendants is in all classes except 10 at

Cambridge	74%
Andover	67%

Of the specimens with two perforations the numbers where these are near the centre and where near the ends are so nearly balanced as to be useless for comparison.

For certain purposes (e.g. as a "buzz-toy") specimens with the perforations near the ends are superior.

WEARING.

All scholars have remarked the little wearing that is apparent upon the specimens. It is a condition, not a theory, that the majority of specimens show no signs of having been used.

In studying the specimens signs of wear were particularly looked for on or about the perforations in the Peabody Museum Collection, whereas the statistics for Andover cover the specimens as a whole. The proportions follow:

Cambridge: of the specimens with perforations 19 are worn at those places and 3 elsewhere or a total of 22; specimens not worn, 87.

Proportion worn	20.2%
Proportion not worn or with wearing not significant	79.8%

Andover:

Proportion worn	5.84%
Proportion not worn or with wearing not significant	94.16%

PART II.

REFERENCES AND ALLUSIONS.

Considered then purely from the point of view of physical characteristics "gorgets" present a class of objects almost exclusively of stone, often of decorative stone, carefully made, with a quite definite purpose of design and presenting a singular uniformity of size and proportions.

The use or uses to which these objects were applied remain uncertain. It is one of the striking difficulties of American archaeology that tradition, so strong, and continuous and uniform in some ethnological fields, tells us little or nothing about the obsolete implements left by the older Indians, their ancestors or by some preceding prehistoric race. History, tales, sketches, and pictures of travelers and explorers tell us hardly more. Therefore a determination of utilitarian design must be striven for by natural suggestion and analogy.

It will thus be well to present the evidence from tradition, history, observation, and analogy and to present the opinions put forth by other investigators.

The following table will present the uses suggested or which offer themselves for suggestion *in re* "gorgets."

USES FOR "GORGETS"

1. As ornaments or decorations without ceremonial significance.
    - a. For the forehead.
    - b. For the ear.
    - c. For the breast.
    - d. As pendants without specialization.
2. In connection with the dress.
    - a. As beads.
    - b. As "comb-shapes."
    - c. As hair-forms.
    - d. As buttons.
    - e. As buckles.

3. In connection with the arts (domestic.)

- a. Under the headings of spinning, and the making of thread, twine or thongs.
    - a. 1. As spindle-whorls.
    - a. 2. As weights.
    - a. 3. As "twine-twisters."
    - a. 4. As thong smoothers.

3. b. Under the headings of weaving and netting.

- b. 1. As shuttles.
- b. 2. As netting-sticks.
- b. 3. As mesh-guages.

4. In connections with the arts (other and general.)

- a. As "tools."
- b. As groove-makers.
- c. As arrow-shaft-straighteners.
- d. As whetstones.
- e. As standards.
- f. As palettes.

5. In connection with games.

- a. As "buzzers."
- b. As puzzles.
- c. As gambling stones or tallies.

6. Uses with ceremonial significance.

- a. As thunder-stones.
- b. As badges.
- c. Under the heading of totemism.
- d. As magic tablets (incribed or not inscribed).
- e. As amulets, or charms.
- f. As bull-roarers.
- g. As ceremonial "gorgets."

7. In connection with the defence of the wrist and arm from the recoil of the bow-string.

As "bracers," "brassards," etc.

In considering the table it may be premised that all the suggestions are physically and logically possible, but that many have little claim, other than such possibility, to acceptance. The offsetting difficulty in the way of faith in any but the "ceremonial" uses is the small proportion of objects showing wear.

While it is again possible that many or any of the specimens under examination may not have arrived at the stage of usage, or may have been thrown away without application to a purpose — while it is yet possible that the majority of the specimens in use have been lost or broken, that the numerous fragments found represent the class of specimens that have been worn in use, and that indifference in collecting has reduced the proportion of fragments to an almost negligable figure — yet it remains yet *a priori* true that the stronger evidence should be adduced in favor of the non-ceremonial suggestions.

In the following discussion space will only be allowed to uses of approved argument; for others the foot-notes will provide references.

Where possible the evidence and analysis from American sources will be given first, those from the foreign field in the next place.

1. (A.) ORNAMENTS FOR THE FOREHEAD.

Such a use in the United States is suggested by Fowke, and analogies are not wanting from elsewhere to show that the forehead shares sometimes with the breast the right of ornamentation by flat surfaces. It is hardly necessary to call attention to the forehead-jewels, considered a necessary adjunct of an "Oriental" costume; the symbolism of the forehead touching the floor in certain salaams, nor the conjunction with the forehead with the breast in the "sign of the cross", the Ash Wednesday customs, etc.

The gold "gorget", resembling those of Class 8, said to be worn on the forehead in ancient Peru, is instructive, as is the placing of the common "single shell" upon the forehead as well as the breast of the women of Fakaofu or Bowditch Island.[1]

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[1] Cf. Fowke, G. *Rep. Bur. Eth.* 13. 1891-'92. pp. 116 ff.

Cf. Fowke, G. *Archaeological History of Ohio.* 1902. pp. 564-566, and Figs. 174 and 175.

Cf. also Crawfurd, J. *History of the Indian Archipelago.* 1820. Vol. I. p. 212.

1. (B.) AS EAR-ORNAMENTS.

Uncouth and unnatural as such a use may appear, a rectangular ear-pendant of lignite of a shape similar to those of Classes 5 B and 9 B, and a size not too small to exclude it from them, has been found in a cemetery in Arizona near the mastoid process of a skull.[2] A shell "gorget"-shape, resembling Class 5 B, has also been used during the Lipans Indians, depending from a ring as an ear-ornament.[3]

The deformation of the lips by labrets of enormous size in America, and of the ears by heavy weights in Borneo, allow little concern to be felt at the grotesqueness of any suggestion of personal adornment.

1. (C.) AS ORNAMENTS FOR THE BREAST, CHEST OR NECK.

Eponymous in name "gorgets" thus used of various materials have abundant evidence, not always of the most relevant character.

The references also include some relating to "gorgets" without nearer definition.

America. The use among Indians generally is referred to by Douglas[4], Wilson[5], Bonaparte[6], and Fowke[7].

The provenance of "gorgets", in addition to the figures of the foregoing tables, is instanced as follows: New Hampshire, Vermont, Connecticut, Massachusetts, and Ohio[8]; New York,

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Cf. also Herndon and Gibbon. *Exploration of the Valley of the Amazon.* 1854 (Peru). Vol. II. p. 74.

Cf. also Lister, J. J. *Notes on the Natives of Bowditch Island.* Journ. Anth. Inst. Vol. XXI. 1891–'92. p. 56.

[2] Fewkes, J. W. *Two Summers' Work in the Pueblo Ruins.* Rep. Bur. Eth. 22. 1900–'01. Part 1. pp. 87–8. Figs. 44–5.

[3] Whipple, Lieut. A. W., and others. *Rep. on Indian Tribes.* U. S. War Dept. p. 51. Pl. 42. A. (2nd.)

[4] Cf. *Geographical Distribution of Relics.* Bull. Am. Mus. N. H., N. Y., Vol. VIII. Oct. 26, 1896. Art. X, pp. 199–220.

[5] Cf. *Prehistoric Art.* Rep. U. S. Nat. Mus. 1896. pp. 452 ff. pl. 33.

[6] Cf. Bonaparte, Prince Roland. *Collection Anthopologique.* (Peaux Rouges) No. 14. (Indian Girl.) Also Nos. 2, 4, etc. (Indian Men.)

[7] Op. Cit. (Bur. Eth. 13.)

[8] Hitchcock. E. *Catalog.* Gilbert Museum. Amherst College. 1904. Pl. II and Description. (Note series towards pendants.)

Pennsylvania, Louisiana and Tennessee[9], Virginia[10]; Michigan[11], Iowa[12]; Pennsylvania, Mississippi, Louisiana[13], Georgia, Florida and Alabama[14], and Arizona (a lignite "gorget" found at Sikyatki[15]), and one of limestone from Jettyto Valley.[16]

A sweeping statement is made by H. C. Mercer[17] that "gorgets" are from all parts of the United States, found generally close to the breasts of skeletons and possessing "no counterpart as far as the writer can learn in the stone implements of other uncivilized races". The statement is too inclusive, though suggestive.

The use of "gorgets" in Canada at any rate for Ontario is well attested[18]. This is not remarkable as the Iroquian influence extended over much of the Province.

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[9] Wilson, Thos. *Reps. U. S. Commission Col. Hist. Exp.* Madrid. Washington 1895, p. 113, Fig. 31. (Mentions the finding of "gorgets" in mounds or graves on the breasts and arms of skeletons.)

[10] Fowke, G. *Bull. Bur. Eth.* No. 23. 1894. p. 28. (Bath Co.)

[11] Smith, H. I. *Archaeology of Saginaw Valley.* Am. Anthrop. N. S. 3. 1901. p. 290. (Bay Port.)

[12] Poole, W. H. *Mound Builders.* Am. Anthrop. Vol. XI, 1898. pp. 41 ff. (Johnson Co.) (?)

[13] Culin Stewart. *Dickeson Collection of American Antiquities.* Bull. Free Mus. Sc. and Art. Phila. Jan., 1900. Vol. II. No. 3. p. 138. (Peabody found no "gorgets" during his explorations in Coahoma Co., Miss., in 1901–2.)

[14] Moore, C. B. Georgia. *Recent Acquisitions.* Phila. 1898. p. 185. Fig. 18. Florida. *Certain Aboriginal Remains on the Northwest Fla. Coast.* Pt. II. Phila. 1902. p. 225. Fig. 161. And elsewhere. Alabama. *Certain Aboriginal Remains of the Ala. River.* Phila. 1899. p. 326. Fig. 47.

[15] Fewkes, J. W. *Expedition to Ariz.* 1895. Rep. Bur. Eth. 17. 1895–'96. Pt. 2. p. 733. Pl. CLXXII. d.

[16] Hough, W. *Field Work in N. E. Ariz.* Rep. U. S. Nat. Mus. 1901. p. 344. Pl. 96. No. 4.

[17] "*The Lenape Stone*", N. Y. and Lond. 1885. pp. 3 and 4.

[18] *Arch. Rep.* Ont., Toronto, for 1898. Nos. 17212. 17231, 17177. (Note 17177, peculiar shield-shaped. See p. 49.)

Cf. also Wintemberg, W. J. *Rec. Past.* Vol. 1. Pt. V. May. 1902. pp. 150 ff. Figs. 10–22 incl.

Cf. also Anderson, R. T. *Arch. Rep.* Ont. 14, 1902. pp. 79 ff. Says "gorgets" are peculiar to Neutrals or Attiwandarons.

Cf. also *Arch. Rep.* Ont. 1903. p. 65. Fig. 27. No. 56578.

Among the Eskimo of Pt. Barrow the use of large wooden "gorgets" at some time is assumed by Murdoch[19], but the fashion has lapsed.

FOREIGN SITES.

That, in spite of Mercer's statement, articles similar to "gorgets" have been found in excavations and explorations in various countries is established and there seems to be the same doubt as to their purpose in the minds of European scholars as in those of American. The following references do not include all, for many stone objects similar to "gorgets" that have been found are assigned to other uses than that of the etymological "gorget."

Arranged by countries, and giving archaeological evidence first we have as follows; England and France[20] from the early caves of Kent's Hole and Cro-Magnon. The specimens from the former cave are probably knives. In Scotland quadrangu- or rectangular stone specimens of the "gorget" type are not uncommon from prehistoric sites,[21] further we have Scandinavia[22], South Russia[23], Poland[24], Bohemia[25], Switzerland[26], France[27] (again), and Portugal[28].

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[19] Cf. Murdoch, John. *Pt. Barrow Eskimo.* Rep. Bur. Eth. 9. 1887–'88. p. 372.

[20] Nadaillac, Marquis de. *Moeurs et Monuments des Peuples Prehistoriques.* Paris. 1888. p. 88.

[21] Cf. Maxwell, Sir H. E. *Proc. Soc. Ant. of Scot.* 1888–'89. p. 217, fig. 23 (Wigtownshire) and

Cf. *Proc. Soc. Ant. of Scot.* (passim).

[22] Cf. Nilsson, Sven. *Les Habitants Primitifs de la Scandinavie.* Trans. fr. Swedish. Paris, 1868. Part 1. Stone Age. p. 107, No. 12, also Pl. X, fig. 205. "Use unknown."

[23] Kohn, A., and Mehlis, Dr. C. *Materialien zur Vorgeschichte des Menschen im östlichen Europa.* Jena 1879. Vol. 1. p. 250. (Bronze medaillon from Sapohowo on Cyganka. "Could be worn on the neck.")

[24] Römer, Dr. F. Trans. by Lee, J. E. *The Bone Caves of Ojcow.* Poland, Lond. 1884. Pl. IV. Fig. 6. (Bone with perforations apparently not contemporaneous; quite comparable to some American fragments) and Pl. IV. Fig. 1. (Bone, rectangular plate, "use unknown".

[25] Cf. Weinzierl, R. v. *Prähistorischer, Wohnplatz und Begräbnisstätte bei, Lobositz a Elbe, Zeitschr f. Ethnol.* 27. 1895. p. 61. Fig. 10. 4. (Bone tablet with two perforations found near the breast of a skeleton.)

MODERN.

The present use of "gorgets" of shell and other materials is common enough, especially with ceremonial significance. This is a later subject: a few references will show a use of such objects in the Altai Mountain region[29], Botany Bay[30], Bowditch Island[31], Torres Straits [2], and Indian Archipelago[33].

1. (D.) AS PENDANTS GENERALLY.

AMERICA.

Most of the writers on the subject at least mention the "ornamental" use of "gorgets" and if ornamental the objects were in all probability often suspended as pendants. Hence the advisability in so many instances of two perforations. Hence also the absence of any hard and fast line of partition between the uses; according to the length of the string the same object may be an adornment for the neck, chest, breast or waist; according also to the method of suspension. Holmes[34], Abbott[35], Jones[36], Rau[37], Wilson[38], Douglass[39] and Beauchamp[40], all speak of such ornament and the fact that "gorgets" are found on or near the breast of skeletons is noted by Abbott, Wilson and Rau.

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[26] **Cf. Merk, C. Trans.** by Lee, J. E. *Excavation at the Kesslerloch.* **(Schaffhausen) Lond.** 1876. p. 44. Pl. IX. Fig. 58 and Pl. XIV, fig. 84.

[27] **Sicard, C.** *L'Anthropologie I.* 1890. pp. 506 ff. Grotto in Aude.

[28] **Cf. Natividade,** M. V. *Grutas de Alcobaça.* Portugulia I. Fasc. 3. **p. 456 Figs. 209 and** 210. Est. XXV. "Os mais curiosos objectos" **were two schist "gorgets"** with two perforations of Cl. 2. C. from **Redondas. Cf. also Recension** in Globus. Vol. LXXXII. No. 18. 6 Nov. **1902. p. 288 and fig.** 19.

[29] **Cf. Jour. Anth. Inst.** XXIV. 1894–'95. p. 84. Shamans wear two **round copper plates on breast.**

[30] **Cf. Lubbock, Sir John.** *The Origin of Civilization and the Primitive **Condition of Man.*** London, 1870. p. 41.

(Shell "gorgets" refers to Hawkesmith's Voyages III, p. 635.

[31] **Cf. Lister, J. J.** Op. Cit.

[32] **Cf. Haddon, A. C.** *Intern. Archiv. f Ethnogr.* 6. 1893. pp. 131 ff. **Pls. XI–XIV. Island dancers.**

[33] **Cf. Crawfurd, J.** Op. Cit.

FOREIGN.

The prehistoric field is here equally rich as for the preceding section, and analogies for "gorgets" have been found in Cornwall[41], France in various parts[42], Belgium[43], Portugal[44], from the Lake Dwellings[45] and in Elam[46].

Few references are needed for the understanding of the use of pendants in later times. Almost every portrait of North American Indians shows some kind of shell or medal depending from the neck, and equatorial[47], and Pacific peoples take great delight in them[48].

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[34] Cf. *Art in Shell* Rep. Bur. Eth. 2. 1880-'81. p. 255. Probably vain to attempt to determine how pendant ornament first came into use—from implement, utensil or fetichistic talisman.

[35] Cf. *Am. Nat.* VII. 1873. pp. 180 ff. and cf. U. S. Geogr. surveys W. of 100th Merid. VII Arch. Wash. 1879. pp. 209-210. Figs. 85 and 86.

[36] Cf. *Ants. So. Inds.* 1873 , pp. 367 ff. Pl. XXII, 2 and 3.

[37] Cf. Smiths. *Contr. to Knowledge.* Vol. XXII, No. 287. 1876. pp. 32 ff.

[38] Cf. Op. Cit.

[39] Bull *Am. Mus.* of N. H., N. Y. Vol. VIII, Art. X.

[40] Cf. *Pol. St. Articles used by N. Y. Aboringines.* Univ. S. N. Y. Bull. N. Y. St. Mus. Vol. V. No. 18. Nov., 1897. pp. 79 ff. Figs. 206 ff. and others.

[41] Cf. Borlase, W. C. *Naenia Cornubiae*, Lond. 1872. p. 213 (Two pendants of Cl. 9. B. Lying by the side of funeral urns at Chapel Euny, Brane Common.)

[42] Cf. Bertrand. A. *La Gaule avant les Gaulois.* Paris, 1891. pp. 132 and 145, figs. 117 and 125. From Hypogie de la Justice, Presles, Seine et Marne. (Stone Age.)

Cf. also de Mortillet, G. and A. *Musée Préhistorique*, Paris, 1881. Pl. LXIII, Nos. 622, 623, 624. (No. 624 is from Portugal.)

Cf. also Riviere, E. *L'Antiquité de l'Homme dans les Alpes Maritimes.* pp. 176 ff., Pl. IX, fig. 13. (Pendant from Cavern 4 of palaeolithic age, "unique in these grottoes".)

[43] Cf. Dupont, M. E. *L'Homme pendant les Ages de la Pierre.* Brussells, 1872. p. 157. (Ivory tablet. Age du Renne.)

[44] Cf. Ribeiro, C. *Estudos Prehistoricos em Portugal.* Lisbon, 1880. Memoria II, pp. 52 and 53, Pl. IV, Nos 1. and 2. Very common pol. stone type of pendant in districts of Leiria, Lisbon, Evora, and Beja.

[45] Cf. Munro, R. *Lake Dwellings of Europe, London, etc.*, 1890. p. 41, and fig. 8, No. 19. ("Ornaments" from Lake Neuchatel and Lake Garda.)

[46] Cf. Capitan, L. *L'Histoire del Elam.* Rev. de l'École d'Anthropologie de Paris. 1902. 12. pp. 193-4, figs. 72, etc.

2. IN CONNECTION WITH THE DRESS.

2. (A.) AS BEADS.

A "gorget" of say Class B. with two perforations near the ends, could of course be strung with others of the same class and be worn as a chain; "problematical" as such a use is, some shell beads from the south have been found large enough to serve as an analogy and another, quite striking, is found in the "stones two or three inches in length, rectangular in shape but tapering somewhat on each face towards the end," that are found on the Island of La Plata, Equador. They have one perforation at each end and the use of beads is suggested[49].

2. (B.) AS "COMB-SHAPES".

Any connection here with the dress is doubtful; the principle of imitation of some utensil is possible, and suggested by the stone "comb-shapes" with two perforations near the side that have been found in Japan; here in the ancient province of Shinano they are not infrequent[50].

2. (C.) AS HAIR-FORMS.

We have here but a single reference, but one whose importance and brevity are alike striking.

The Hudson Bay Eskimo use boards of the shape and size of the "gorgets" of Class 5, A. for winding the hair of the

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[47] Cf. Hartmann, R. *Die Nigritier.* Berlin. 1876. Tafel XXX. 3. and Tafel XXXVIII, 4.

[48] Cf. Jenkins, J. S. *Voyage of the U. S. Exploring Squadron under Capt. Wilke, 1838-'42, etc.* (1856.) p. 407. (For Gilbert, Tarawan & Kingsmill Ids.)

Cf. also Edge-Partington, J. *Album of Pacific Islands.* Manchester, 1st Series 1890, No. 147, Nos. 3 and 6 (New Hebrides). 2nd Series 1895, No. 238, No. 3 (Unlocated).

Cf. also Somerville, B. T. *Journ. Anthrop. Inst.* XXVI, 1896-97. p. 362 (New Georgia. Solomon Ids.)

[49] Cf. Dorsey, G. A. *Field Col. Mus. Pub. 56 Anthrop. Ser.*, Vol. II, No. 5, Chicago, April, 1901, p. 265, Pl. LX.

[50] Cf. Kanda, T. *Ancient Stone Implements of Japan.* Tokio, 1884. Pl. XII, No. 4.

women[51]. They are used in pairs (not unnaturally) and the use of such forms and such arrangements of the hair is illustrated in the coiffures of the maidens of the Moki tribe today. See Pl. VIII.

That the Indians may have used "gorgets" for the purpose is not at all improbable; wood and stone may have been used at the same time, or the stone may have been given a ceremonial significance on the principal of imitation of the common forms in wood. It is to be remembered, also, that stone before the Discovery was in much more common use than afterwards. The permission to make the illustration and the calling of the attention of the authors to the hair-forms is to the credit of Mr. C. C. Willoughby, assistant Curator of the Peabody Museum.

2. (D.) AS BUTTONS.

A self-evident use for "gorgets" is that of buttons; they are, many of them, of the shape and size of an old fashioned door-button and could readily enough be attached to a skin or robe and a noose from the other side be passed over to fasten the sides together; a modern great-coat may be cited as an illustration.

The ridged "gorgets" (Class 6) with their perforations heavily countersunk from one side seem peculiarly adapted to this use; see Pl. II, No. 4. Such an assumption is supported by the "gorget" of lignite, flat-convex, "button-shaped," with perforations near the middle of one face from Arizona[52], and by the suggestions of Fowke[53], Mercer[54], and Putnam[55]. European analogies are not wanting[56].

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[51] Cf. Turner, L. M. *Rep. Bur. Eth.* 11, 1889-'90. p. 320, fig. 147.

[52] Cf. Fewkes. *Rep. Bur. Eth.* 22, 1900-'01. Part I, fig. 45.

[53] Cf. *Arch. Hist. O.* pp. 564-566.

[54] Cf. *Lenape Stone*, pp. 3-4.

[55] *Suggestions to the Authors.*

[56] Cf. Munro, Dr. R. *Proc. Soc. Ant. Scot.* 1901-'02. p. 487, figs. 6 and 7. (Describes five jet buttons, one of amber from Baltic province, one of bone from Portugal; both are very suggestive. Note perforations.)

Cf. also Siret, H. and L. *Les Premiers Ages du Métal dans le sud est de l'Espagne.* Antwerp 1887. (Text) pp. 27, 60, 119, 120 (discusses wearing and perforations.)

2. (E.) AS BUCKLES.

This use may be considered as a development of the last with some added inherent probability.

The size of the average "gorget" and shape are more appropriate to our conception of a buckle than of a button. Fowke, in his eight uses suggested in his Archaeological History of Ohio, includes buckles, and foreign scholars have included with perhaps no more reason the stone and bronze prehistoric shapes (like Class 5 of "gorgets") in the class of buckles[57].

3. IN CONNECTION WITH THE ARTS (DOMESTIC). 3. SPINNING, AND THREAD OR THONG MAKING.

3. (A.) 1. AS SPINDLE WHORLS.

The universality of spindle whorls is such as to tempt scholars to call almost any unknown implement by that name; the round flat piece of wood, used to receive and twist the stick on which the thread is wound in modern Greece, makes it seem that similar objects of stone may have been so used. The uniformity of type in spindle whorls, and the central perforation almost always present more or less, throw out the use for the "gorget" problem. The Cornwall pendants are suggested by the author as whorls[58], and apposite is the case of the quadrangular piece of bone with a perforation in each corner, from Sweden, belonging according to the reviewer to a "*peigne de tisserand*", such as are in use today in La Scanie[59], "*pour tresser en bandes les fils*". Cf. the uses under twine.

3. (A.) 2. AS WEIGHTS.

The reference here is dubious. The "weights" found in Spain may have been put to numerous uses besides those in connection with the textile arts. The clay objects, figured by the reviewers, are suggestive, and save for the perforations are quite similar in form to "gorgets" of Class 2, B (ovate, sides straight[60]).

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[57] Cf. Engelhardt, C. *Das Museum für Nordische Alterthumer.* Copenhagen, 1880, p. 9, figs. 6 and 7. (Gives name Gürtelbeschläge.)

Cf. also Gross, V. *Les Protohelvètes.* Berlin, 1883, pp. 65 and 112, Pl. XIV, No. 4. (Several "Garnitures de Ceinture" have come from Auvernier, Switzerland.)

[58] Cf. Borlase, W. C. *Naenia Cornubiae*, p. 213.

[59] Cf. Stolpe, Hjalmar. *Les Decouvertes faites dans l'ile de Björkö.* Stockholm, 1876. pp. 6 and 14, figs. 37 and 38.

3. (A.) 3. AS TWINE–TWISTERS.

If threads are to be twisted together, no better instrument could be devised than the average "gorget" with two perforations. Experiment has made this clear and will establish the point to any one who tries.

The use as twine-twisters is suggested by Fowke in both his articles referred to, and by Rau, and Schoolcraft[61] has pictures of implements with two perforations "for twine-making", while Beauchamp[62] and Jones consider the ornamental use more probable than that in connection with strings.

3. (A.) 4. AS THONG–SMOOTHERS.

Strings or thongs could readily have been pulled through one or both of the usual perforations; two "gorgets" also rubbed together would also tend to the equalizing of the diameters of refractory funiculi. Hence the uses are given in the lists of Fowke, MacLean[63], Jones, and Rau; also in the discussion of the Spanish forms by H. and L. Siret. But as MacLean remarks, the argument from "no wearing" acts most adversely to the last two suggestions.

3. (B.) WEAVING AND NETTING.

3. (B.) 1. AS SHUTTLES.

This use is mentioned by Fowke[64], twice, MacLean, Read[65], and Short[66], call the "gorgets" from the mounds by the name of "shuttle-like tablets".

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[60] Cf. Siret, H. and L. *Les Premiers Ages du Metal dans le sud-est de l'Espagne.* Antwerp, 1887. *Album.* Pl. 3. Nos. 24–7. (Neolithic.)

[61] Cf. Schoolcraft, H. R. Hist. and Stat. *Information Respecting Indian Tribes.* U. S. Phila. 1851. Pt. 1, pp. 89–90. Pl. 28, figs. 2–5.

[62] Cf. *Pol. Stone Articles.* Bull. N. Y. St. Mus. V. 18, pp. 79 ff.

[63] Cf. MacLean. *Mound Builders.* pp. 70–71, figs. 18 and 19.

Cf. also Lyon, S. S. *Ancient Mds. in Union Co., Ky.* Rep. Smithson. Inst. 1870. p. 404. Eye-witness of use among Pah-Utes of S. E. Nevada.

[64] Fowke in *Rep. Bur. Eth.* refers to Chase. Ms. on Shell Mds. of Oregon.

Some of the ovate and leaf-shaped "gorgets" are not unlike shuttles in form and, in the absence of lighter instruments, could have been used for the purpose.

3. (B.) 2. AS NETTING–STICKS.

A suggestive reference to the wooden netting-stick of the Thompson River Indians, shows an implement almost identical in size and shape to the hair-forms of the Hudson Bay Eskimo; it is also in such ways identical save for material with "gorgets" of Class 5 A (rectangular, sides concave)[67].

3. (B.) 3. AS MESH–GUAGES.

A remarkable series of mesh-guages of the Northwestern Indians has been collected by Dr. A. L. Kroeber of the University of California.

The similarity of some of these wooden forms to "gorgets" is so striking, that, coupled with the preceding reference, a possible and even probable use for some of the specimens may be assumed.

4. IN CONNECTION WITH THE OTHER ARTS.

4. (A.) AS "TOOLS".

Only vague reference may be made to this use; those with a single perforation and a sharpened edge may have thus served, though it is easier to suppose either that the celt or gouge thus formed to have been considered as possessing some "ceremonial" significance, or that the perforation was drilled for the purely utilitarian purpose of suspension in the proper place.[68]

4. (B.) AS GROOVE–MAKERS.

A single reference is given by C. C. Jones in his "Southern

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[65] **Read, M. C.** *Arch. of Ohio.* Cleveland. 1888. p. 40 and figs. on p. 41.

[66] **Cf. Short, J. T.** *North Americans of Antiquity.* N. Y. 1880. (1879.) **p. 71.**

[67] **Cf. Teit, J.** Ed. by Boas, F. *The Thompson Indians of Br. Col.* **Mems. Am. Mus.** of Nat. Hist., N. Y. Vol. II. Anthropology I. No. IV. **April, 1900. p. 191,** fig. 134. Mus. No. $^{16}/_{4629}$.

[68] **Cf. Wintemberg,** W. J. *Rec. Past.* Vol. I. May. 1902. pp. 150 ff. **and Beauchamp** op. Cit.

Indians " to a use of " gorgets " in making grooves by fastening a bear's tooth over a large perforation and then (presumably) drawing a wooden shaft through the hole[69].

4. (C.) AS ARROW–STRAIGHTENERS.

A few tablets in our museums have perforations large enough to permit the passage of an arrow shaft in a straightening and smoothing process; but the ordinary " gorget's " perforation would hardly allow of this.

4. (D.) AS WHET–STONES.

The use, in view of the lack of wearing, seems untenable; it is mentioned, however, in view of the striking analogies from the foreign field. For instance, the quadrangular stone from Scotland, 3 1-4″ x 2″ x 1-4″, and the implement, 2 1-2″ long, with perforations at either end from Fuente Vermeja (Spain)[70].

4. (E.) AS STANDARDS.

The late F. H. Cushing held the opinion that some of the " gorgets " could be used as platforms or standards for figures (e. g. " bird-stones ") or other objects. The absence of instances of contiguity of discovery, and the apparent dissimilarity in the proportions of perforation-interstices militate against this view.

4. (F.) AS PALETTES.

Ceremonial palettes, upon which figures could be drawn and erased, are common in the southwestern United States, and take the forms sometimes assumed by " gorgets "; this use would leave but few traces of wear; see Pl. VII, figs. 1 and 2

To compare with these is the remarkable series of Egyptian palettes in slate[71], that begins with plain rhombs and continues in chronological order through forms of quadrupeds, fishes, turtles, birds, double-birds, to rectangles with notched or lined edges. Note also the prehistoric Egyptian figures[72] of steatite and limestone of which one has the shape of a shield-shaped "gorget", and for which the author of the article wishes an analogy or explanation.

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[69] Jones quotes a letter of Catlin to Charles Rau to this effect.

[70] See the Proc: Soc: Ant: Scot: (passim.) and Siret, H. and L. (Opera Cit.)

Cf. also *Jesuit Relations*, Vol. 6, pp. 193 circ. Shaman places a "whetstone" in a wooden spoon, during a ceremony. The stone was striped and was used as the object of "philosophizing".

[71] Cf. Flinders Petrie, W. M. *Jour. Anthr.* Inst. XXIX, (N. S. II.) 1899. pp. 299 ff., Pl. XXXI.

5. IN CONNECTION WITH GAMES.

5. (A.) AS BUZZERS.

Experiment will prove that the average "gorget" with two perforations, if a string be passed through them and twisted, will, upon the strings being tightened, whirl with a buzzing noise, usually in a low tone.

Such "buzz-toys" are very common, and the use one to which many of the existing "gorgets" are peculiarly applicable. The specimens with a greater distance between the perforations in proportion to the total length make the most successful toys. If spun upon a leather thong, wearing would be little apparent. The use as buzzers approaches that as bull-roarers, of which more later.

The uses of this toy may be noted (1) among the Navajo[73]; it is of wood, swung at the end of a string, should be made from a pine struck by lightning, is about 9″ x 1 3-4″ x 1-4″, and is called a "groaning stick"; (2) among most of the western tribes, where it may be a piece of wood about 6″ long, notched and painted[74], and at the Pine Ridge Reservation where a "buzz" of bone is called hohouh yuhmunpi, and one of wood a tateka yuhmunpi[75].

Other instances of the toy are found among the Eskimo[76], at

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[72] Cf. Flinders Petrie, W. M. "*Man*", 1902 Pl. B. (No. 14 Original Article: Prehistoric Egyptian Figures, No. 21.)

[73] Cf. Matthews, W. *Mountain Chant of the Navajo.* Rep. Bur. Eth. 5. 1883–'84. p. 436. fig. 56.

[74] Cf. Mooney, J. *The Ghost Dance Religion.* Rep. Bur. Eth. 14. 2. p. 975. fig. 93.

[75] Cf. Meeker, L. L. *Ogalala Games.* Bull. Free. Mus. of Sc. and Art. Phila. Vol. III, No. 1, Jan., 1901. p. 34. fig. 18 and fig. 19.

[76] Cf. Nelson, E. W. *The Eskimo about Bering Strait.* Rep. Bur. Eth. 18, 1896–'97, part I. p. 341. ("Buzz" of wood, ivory, bone, or (later) metal.)

Pt. Barrow, Alaska[77], in British Columbia[78], in Hawaii[79], in Japan, Corea, and China[80], and Ceylon[81], and France[82].

5. (B.) AS PUZZLES.

The specimens with two or more perforations could serve as parts of "string" puzzles, comparable to the present children's game of passing cords through the button-hole and releasing them by "black art". This use is earnestly suggested for a tablet from New York by Tooker[83]; Douglas includes it in his list, and a comparison with the wood puzzles of Hawaii (with two or three holes and strings) is instructive[84].

5. (C). AS GAMBLING STONES OR TALLIES.

It is possible that some of the numerous specimens that have notchings on the ends and sides, or that have scratchings on the faces, may have been used as counters in some game. The purpose of a great deal of the notching, so common on American specimens, is unknown, and would bear scientific study; the comparison from Denmark is interesting[85].

Cf. also Kroeber, A. L. *The Esk*[illegible] Bull. Am. Mus. Nat. Hist., N. Y., Vol. XII, 1900, Art. XXI, [illegible] Mus. No. [illegible] "Bull-roarer" [illegible].

Cf. also Boas, F. *The Esk*[illegible] *H*[illegible] *B*[illegible] Bull. Am. Mus. Nat. Hist., N. Y., Vol. XV, [illegible] Art. [illegible] a and b. Mus. No. [illegible].

[77] Cf. Ray, P. H. [illegible] *Pt. B*[illegible] Wash. 1885, [illegible] "Whirligig" [illegible]

[78] Cf. [illegible] "Bull-roarer" still played with.

[79] Cf. Culin, S. *H*[illegible] Am. Anthrop., N. S. 1, 1899, p. [illegible] "buzzers" and bull-roarers [illegible]

[80] Cf. Culin, S. *K*[illegible] "Paper vanes, [illegible]"

[81] Cf. Seligmann, C. [illegible] XI [illegible] p. 4[illegible] "Bull-roarers [illegible]"

[82] Cf. C[illegible] [illegible] Comparison [illegible] St. Ma[illegible] bull-roarers.

[83] Cf. Tooker, W. W. [illegible] New York [illegible] Rep. Smithsonian Inst. 1881, [illegible]

[84] Cf. Culin, S. *H*[illegible] Am. Anthrop., N. S. 1, 1899. Pl. XII [illegible]

[85] Cf. [illegible] 1868–75. Text fig. [illegible]

6. USES WITH CEREMONIAL SIGNIFICANCE.

6. (A.) AS "THUNDER-STONES".

"Thunder-stones", or prehistoric implements, invested with the idea of having fallen from heaven, of being "thunderbolts" and therefore sacred, are so common that the class may well have included some of the otherwise unknown "gorgets". The prehistoric stone cylinders of Japan are a striking instance[86].

6. (B.) AS BADGES.

Such a use is suggested by MacLean, Wilson, Douglas and Rau. Some of the "gorgets" that approach in form the shape of the banner-stone may have been employed in this way, and certain foreign analogies may be cited. In Siam children wear a large badge about the neck[87], and in Western Africa, among the Egbas, a flat wooden instrument, 5″ x 2″, is hung on a stick, and represents the executive of state deified[88].

6. (C.) UNDER THE HEADING OF TOTEMISM.

The few "gorgets" with figures of animals (e. g. turtle, cf. Pl. IV) are highly likely to have been carried as emblematic of some tribal or individual totem. The analogies for this use carry one into the domain of the "churinga", of which more later. A definition may be appositely presented here.

Spencer and Gillen define the Australian churinga as stone emblems of individuals, etc., having patterns and connected with totemism; 3″ to 5′ long, including those of wood. The wooden forms possibly took the place of those of stone on account of their lighter weight[89].

6. (D.) AS INSCRIBED OR MAGIC TABLETS.

Besides the use of tablets as palettes, inscribed plates of stone, metal or wood have been found in widely separated places. The classical use of tablets for imprecations and petitions is well known[90]; instances are at hand of inscribed tablets from Australia[91] and Easter Island[92].

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[86] Cf. Geerts, A. J. C. *Les Produits de la Nature Japonaise et Chinoise.* Yokohama, 1878. Pl. XII, fig. 6.

[87] Cf. Latham, R. G. *Descriptive Ethnology.* Lond. 1859. Vol. 1, p. 199.

[88] Cf. Murdock, J. *Am. Anthrop.* Vol. III. July, 1890. p. 258.

[89] Cf. *The Native Tribes of Central Australia.* Lond. 1899. pp. 130 ff. Cf. also "*Folk-lore*" X, 1899. p. 493.

6. (E.) AS AMULETS OR CHARMS.

Amulets are universal; from prehistoric thunder-stones to rabbit's feet, all kinds, shapes and materials of substances have been and are still worn with curative or preventive intent.

MacLean, Mercer and Wilson include the use in their lists; there is a figure of a Florida Indian at the time of the Conquest wearing an amulet upon the left arm[93] (this seems more properly to belong under the category of "bracers"), and small wooden duplicates of the "rhombus" or "bull-roarers" are used by the Apaches as amulets[94].

The references for the more general use of small amulets are legion. A small survey of those most pertinent may be given.

Near the upper Amazon[95], a cylinder of quartz, called Pehé, is much prized, is hung on the breast, is kissed by the children, and it is bad luck to give it away.

The transformation of an implement from implement to amulet is discussed by the de Mortillets[96], and early German amulets by Gummere[97]; the Portugese objects, described by Ribeiro, were possibly amulets[98].

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[90] Cf. Pulsifer, W. H. *A History of Lead*, N. Y. 1888. p. 158 (Dodona).

[91] Cf. Carnegie, D. W. *Jour. Anth. Inst.* Vol. XXVIII. 1898–'99. p. 20, figs. Pl. I, figs. 1, 2 and 3. (W. Australia "Rarities and Mysteries".)

[92] Cf. Dalton, O. M. "*Man*", Jan., 1904. No. 1, pl. A.

[93] Cf. Frobenius, L. *Weltgeschichte des Krieges*, Hannover, 1903. p. 221, figure.

[94] Cf. Bourke, J. *Medicine Men of the Apache*. Rep. Bur. Eth. 9. 1887–'88. p. 587.

[95] Cf. Pfaff, Dr. F. *Die Tucanos*. Zeitschr. f. Ethn. 22, 1890. pp. 596 ff. (Verhandlungen.)

[96] Cf. *Musée Préhistorique*. Pl. LXIII. Nos. 622-4.

[97] Cf. *Germanic Origins*. p. 214 and p. 428.

Cf. also Jentsch, Zeitschr. f. *Ethn*. 19, 1887, p. 289. (Thin perforated tablet 3.3 x 2.3, cm.)

Cf. also Naue, Dr. *L'Age du Bronze dans la Haute Bavière*. pp. 218, 219, Pl. XL. (Pl. III, 13). Bull. Soc. d'Anthr. de Lyon. 10, (1891), No. 2.

[98] *Estudos em Portugal*, pp. 52-3. Lisbon, 1880.

In the wearing of amulets at the present time, the equatorial races are easily foremost; shells, often single, are worn on the breast by Pacific Islanders, and are regarded with a veneration that makes them difficult to procure[99]. Note, too, the axe-head charms of the Congo district[100], and the fishing charm[101]. Dr. R. Martin[102] speaks wisely of the use of "Zaubermittel" in connection with many ornaments.

6. (F). AS BULL ROARERS.

The ceremonial use of the bull-roarer is widespread; its principal seat is in Australia where the whirring "churinga" or roarer casts terror into the hearts of the women and the young novitiates. In shape some of the bull-roarers approach that of "gorgets" and even the smaller "gorgets" in the game of buzz above mentioned make a deep-toned humming.

Fowke includes it in one of his lists, and the employment of the instrument in the S. W. is mentioned by Bourke. In the snake dances of Tusayan it is a rain-compeller, and it is also found among the cliff-dwellers ruins, in the Rio Grande Pueblo, among the Zuni and the Utes[103].

Among the Dieri of Central Australia the bull-roarer is called Yuntha and is of wood 7″ x 2″ x 1-16″ with notches and attached to a string 10′ or 12′ long[104]. A specimen with apparently two perforations is figured by Mathews[105], who also cites the bull-roarers provenance from the Maoris, the Africans, the North American Indians, and the Greeks. The rubbing ceremony[106], of this instrument among the Dippel Tribes of

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[99] Cf. Somerville, B. T. *Jour. Anthr. Inst.* XXVI. 1896 97. p. 362. (Solomon Ids.)

Cf. also Gardiner, J. S. *The Natives of Rotuma. Fiji.* (called Tiaf hapa). Ib. XXVII. p. 412.

[100] Cf. Burrows, Capt. J. *Jour. Anthr. Inst.* Vol. XXVIII. N. S. 1. 1898–'99. p. 46, Pl. II, figs. 1–4.

[101] Cf. Crooke, W. "*Folk-lore*" XI. 1900. p. 24. and Peabody, C. *Bull. Mus. Sc. and Art.* Phila. Vol. 3. No. 3. p. 25.

[102] Cf. *Die Inlandstämme der Malayischen Halbinsel.* Jena. 1905. p. 681.

[103] Cf. Bourke, J. G. *Rep. Bur. Eth.* 9. 1887–'88. pp. 476 ff.

[104] Cf. Howitt, A. W. *Jour. Anthr. Inst.* XX. 1890-'91. pp. 83 ff.

[105] Cf. *Jour. Anth. Inst.* XXVII. 1897-'98. pp. 52 ff. and Pl. VI. fig. 12.

[illegible] presents some rather interesting details. The [illegible] of the tribes of German New Guinea are mentioned in a description of the Hungarian National Museum[107], and Codrington speaks of them from the same island. In Melanesia they are found in Banks and Florida Islands[108]. In Africa the Yoruba of the Niger[109], and Bushmen[110], provide instances.

6. [illegible] AS CEREMONIAL GORGETS.

A [illegible] suggestion is that of the Rev. A. G. Morice[111] that among the western Dénés ceremonial "gorgets" [illegible].

[illegible] however so striking as to [illegible]. The [illegible] of Southern Bolivia[112], possess among the [illegible] of their ornaments a sort of "Piastra [illegible] by a cord from the neck. In Portugal [illegible] gorgets ornamented [illegible] the perforations represent [illegible] these are called by the author "re[illegible]" and they are peculiar to the neolithic period in Portugal[113].

7. IN CONNECTION WITH THE DEFENSE OF THE WRIST AND ARM.

Of all the [illegible] suggested for which foreign archaeological analogies [illegible] is so prolific in results as the use as

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[106] Cf. Matthews R. H. [illegible] Am. Antiq. N. S. 2. 1900. p. [illegible]

[107] Cf. Eth[illegible] III. pp. [illegible] ff., Pls. XXI and XXII. Budapest [illegible]

[108] Cf. Codrington R. H. Melanesians. Oxford. 1891. pp. 80 and 98.

[109] Cf. de Cardi, Comte C. N. Jour. Anthr. Inst. XXIX. N. S. II. 1899.

[110] Cf. Balfour, H. Jour. Anthorp. Inst. XXXII. N. S. V. 1902. pp. 17[illegible] ff. Pl. XII. fig. 8.

[111] Cf. Trans. Can. Inst. No. 7. Vol. IV. Pt. I. Mar., 1894. p. 35.

[112] Cf. Campana D. Del. Archiv. per la Antr. e la Etn. Florence. Vol. XXXII. Fasc. 1. 1902. p. 60. Pl. VII. fig. 5. and Pl. I.

[113] Cf. Cartailhac. E. Crit. of Vasconcellos Religioes da Lusitania L'Anthropologie. 9. 1898. pp. 720 ff., figs. 2-5.

a wrist-guard or bracer, for protection of that part from the recoil of the bow-string; it will be well therefore to look a little closer into the employment of this instrument.

Fowke, and Read and MacLean mention the use in discussing "gorget" and the last thinks that the position in which they are found in graves indicates that they were attached to the arm.

Beauchamp speaks of the use merely to refute it by the lack of direct evidence. As to the historical use of the bracer in the United States it is undeniable that very many pictures of Indian archers exist without any wrist-guard whatever.

When wrist-guards were or are employed they differ in material from the stone of the "gorgets"; those of leather are the most common. Nevertheless the rectangular flat "gorgets" would have served the purpose.

Evidences for the use of the bracer in America are as follows: for the Omahas[114] (leather); for the Indians about Ft. Wayne, Indiana[115], (eye witness of the use of "gorgets" as bracers among the Miamis); for the Shoshonees[116]; the Yuma[117], and for the North American Indians generally[118].

Among the Eskimo bracers are yet made near Pt. Barrow though bows are now mostly used by children[119]; they are made of horn or bone with numerous and decorative perforations; also the Bering Strait Eskimo provide specimens of bone, convex in section[120]. They are found in Alaska of bone or horn with perforations[121] and there are specimens in the Peabody Museum from the Eskimo.

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[114] Cf. Dorsey, J. O. *Rep. Bur. Eth.* 13. 1891-'92. p. 287.

[115] Cf. Robertson, R. S. *Am. Ant.* I. 1878. p. 100.

[116] Cf. Stevens, E. T. *Flint-Chips.* Lond. 1870. p. 567.

[117] Cf. Whipple, Lieut. A. W. &c. *Rep. on Indian Tribes.* Plate of Yuma Inds.

Cf. also Emory, W. H. *Rep. U. S. and Mex. Borndary Survey.* Wash. 1857. Vol. 1, Pl. opp. p. 110.

[118] Cf. Dodge, Col. R. I. *Our Wild Indians.* Hartford, 1882, p. 420.

Cf. also Mason, O. T. *N. A. Bows, Arrows and Quivers.* Rep. Smithson. Inst. 1893. p. 646.

[119] Cf. Murdoch, J. *Rep. Bur. Eth.* 9. 1887-'88. pp. 209-10. figs. 193-4.

The foreign archaeological record of the bracer is a long one; they are often identical almost, in size and shape with the typical "gorget" and save for the greater number of perforations (often one at each corner) offer a striking analogy.

Such bracers are commonest in the north but are found elsewhere well scattered. The references are given that assist in enlightening the discussion[illegible].

The later use of the wrist-guard is bound up, of course with the story of the bow and arrow; it seems to be by no means indispensable to archery; it is of more of a convenience than a necessity; hence the paucity of reference to it in the books on

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[illegible] Cf. Nelson, E. W. *Rep. Bur. Eth.* 18. 1896-'97. Part I, pp. 161-2, Pl. LXI. b., figs. 4 and 19.

[illegible] Cf. Ray, P. H. *Exp. to Pt. Barrow.* p. 74.

[illegible] Great Britain. Evans, J. *St. Imps. of Gr. Brit.* N. Y. 1872. Ch. XIX. pp. 380 ff. A notable series; in one case there is a single preforation in the middle of each end.

Anderson, J. *Scotland in Pagan Times.* (Bronze and Stone Ages.) Vol. 1, pp. 15 ff. and p. 51.

Coles, F. R. *Proc. Soc. Ant.* Scot. 1901-'02. p. 530.

Callander, J. G. *Proc. Soc. Ant.* Scot. 1902-'03. pp. 166 ff.

Anderson & Black. *Proc. Soc. Ant.* Scot. 1887-88. pp. 350 and 366.

Windle, B. C. A. *Rems. of the Preh. Age in England.* Lond. 1904. pp. 86-7.

Scandinavia. Montelius, O. *Archiv. f. Anthropologie.* XIX. 1890. pp. 13 f. Mentions bracers from Denmark and Germany; also other countries from stone or early bronze ages.

Montano, Dr. *L'Anthropologie.* 1891. pp. 56 ff. (Critique of preceding article.)

Madsen. *Antiquités Préhistoriques du Danemark.* Copenhagen, 1869. pl. XXV, fig. 16.

Switzerland. Piroutet, M. *L'Anthropologie.* 11. 1900. p. 391 and fig. 30. (Bronze gauntlets from Jura.)

Italy. Black, G. F. *Cat. Nat. Mus. Ant.* Scotland. Edinburgh, 1892. p. 38. No. A P (11, 12) (mentions flat, oblong, perforated stones from Calabria).

Spain. Siret, H. and L. Rev. d. *Questions Scientifiques.* Brussels, 1888. *Les Premiers Ages du Métal dans le sud-est de l'Espagne.* p. 21, pl. 11, fig. 30. (Bracer of clay.)

Argentina. Ambrosetti, J. B. *El Bronce en la Regiōn Calchaquí.* (An. Mus. Nac. de Buenos Aires. Ser. 3a; T. IV) p. 163 á 314 and pp. 224 ff. (Bronze armlets.)

archery. For instance it was not required among the Ainos of Yézo nor by some old English archers[123]; and apparently they are not needed in Tonga (near Samoa)[124]. But its use is also well substantiated.

There is a figure of a German archer of the first half of the sixteenth century[125], with wrist-guard and it is still used in America[126], in the Netherlands[127], and widely among primitive peoples[128].

Of the thirty-three suggestions that have been made and illustrated the most reasonable from the point of view of archaeology and analogy are those of pure ornament, of ceremonial ornament and of the bracer. The innumerable shell and metal breast ornaments worn by the Indians, and their love of rite and ceremony support the first two and the striking analogies from the foreign fields the last.

As a general summing up one may not say that "gorgets" were all used for any one purpose, nor yet that any single use is impossible. They very likely were used for many purposes and any attempt to limit the number is more or less beside the mark.

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[123] Cf. Morse, E. S. *Essex Inst. Bull.* Oct.-Dec., 1885. pp. 6 and 7.

[124] Cf. von. Luschan. *Zeitschr f. Ethn.* 31. 1899. (Verhandlungen) p. 222.

[125] Cf. *Century Magazine.* Vol. 14. 1893. p. 298.

[126] Cf. *Country Life in America.* Jan., 1905. p. 274.

Cf. also the specimens exposed for sale in shops for "sporting goods".

[127] Cf. Staudinger, P. *Zeitscher f. Ethn.* 32. 1900. p. 366. (Verhandlungen.)

[128] Chinese, cf. Culin, S. *Journ. Am. Folk-lore.* III. 1890. pp. 198-9.

Torres Straits, Haddon, A. C. *Folk-lore.* I. 1890. pp. 73 and 81.

New Guinea, Haddon, A. C. *Int. Archiv. f. Enthogr.* 4. 1891. p. 178. Pl. XV.

Camerun, Dr. Karutz. *Globus.* LXXVI. 1899. pp. 386-7, fig. 30.

Asia, Tschuktschen (sic) Frobenius L. *Weltgeschichte des Krieges.* 1903. p, 49, 2nd fig.

PART III.

STUDY OF INDIVIDUAL SPECIMENS.

A few specimens from the Peabody Museum, presenting idiosyncratic variety are here given in Plates IV-VIII. These are followed by representatives of certain typical forms illustrating the categories and certain abnormal forms from the Andover Collection. The description of the Andover specimens was prepared by W. K. Moorehead.

PEABODY MUSEUM.

No. 65659, Class 2, C (Ovate, sides convex). Pl. IV fig. 1. This specimen from the Abbott Collection from New Jersey is apparently a natural stone; the use of natural unworked stones in decoration is widespread. The flatter surface is worn as if it had been in contact with the clothing and upon the convex face is a well worked figure of a turtle in relief. It is one which strongly suggests totemic significance. The two perforations are skilfully bored, very near the ends and in such a way that the stone hangs symmetrically when suspended. One side is less convex than the other; considering this as the lower side the turtle appears in a life-like pose, well framed by the outline of the stone. The specimen is suggestive as showing that other things being equal the more convex surface or side is likely to have been the outer or upper.

Nos. 11609 and 11595 Class 9 C (Oval or circular), Pl. IV, figs. 2 and 3 are also from the Abbott Collection from New Jersey. These also may be natural stones; they carry grotesque reliefs of the human face. The eyes and nose of the former taken as a single figure resemble somewhat a rough geometrical variation of the "banner stone."

The noses of the two faces are fashioned somewhat similarly; rectangular with parallel sides they emphasize a breadth rather than the triangular outline of the feature usually seen in primitive representations. The mouths are dissimilar; in one case the form is (more or less) elliptical, in the other crescentic in outline.

Nos. 56055 (from West Virginia) and 2685 (from Massachusetts) Pl. V, figs. 1, 2 and 3, are exceedingly rough specimens from Class 2 C (Ovate, sides convex). The former, apparently, a piece of a soapstone vase, has the very unusual feature of incised decoration on the broad sides. It is a rough chevron-like pattern, made with more skill than is the specimen itself. On the inner face is scratched in outline a human head and shoulders, very inchoate in execution. One may thus suggest three periods in the completion of this "gorget". The Massachusetts specimen, likewise probably a piece of a vase, is notched in such a way as to suggest tally marks[1].

No. 564, from New Hampshire, Pl. VI, fig. 1, is the only specimen from northern New England among the "gorgets" of the Peabody Museum. It refuses classification, in spite of its apparently typical shape; it may be put in the ovate, leaf-shaped, or rectangular groups, and is a good instance of the "shading off" of one class into another.

Nos. 36081 and 36082 from Ohio, (Cl. 5 B) Pl. VI, figs. 2 and 3, are interesting as showing the use, as it were, of the part for the whole. This archaeological synecdoche may have come about during the manufacture of the implement or afterwards; a fracture having occurred at one of the perforations, the fragment still preserved the virtue of the original and could be used as a pendant. For the symmetrical suspension of this, the drilling of two more perforations was necessary This is perhaps as easy an explantion of the four perforations as any other.

No. H 18 and No. H 244, from the Pueblo region of the southwest, Pl. VII, figs. 1 and 2, represent the tablets used for carrying cabalistic figures to be washed away and introduced into the sacred medicine drinks. As an attested use of a form similar to "gorgets" these are interesting, and bear close analogy to the Egyptian palettes. No. 244 is another instance of a fragment probably worn as a pendant, carrying with it the magic virtue of the whole.

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[1] Cf. Lartet and Christy. *Reliquiae Aquitanicae*. Text. pp. 187 circ. and cf. also de Mortillet, *Musée Préhistorique*. Paris. 1881. Pl. XXII. fig. 153.

No. 56537, from Massachusetts, Class 9 B (pendants, rectangular) Pl. VII, fig. 3, not only has distinct wearing of the perforation indicating long suspension, but has upon one face a wide rectangle and scratchings, suggesting the palette forms, and also a series of notches on sides and ends.

No. 48108, from the Naskapee Indians of Canada, Pl. VIII, represents the hair-forms of wood that resemble closely the "gorgets" with concave sides.

DESCRIPTION OF SPECIMENS AND THE STUDY OF SPECIMENS AT ANDOVER.

The Department of Archaeology of Phillips Academy, Andover, Massachusetts, has collected, during the past four years, something like nine hundred unfinished or partly finished ornaments, "gorgets", "ceremonials", and other stones which may be aptly described as "problematical". Following the method of natural history, an observer may trace with an apparent degree of accuracy the evolution of the thin, polished, perforated tablet from the crude, rough-hewn turtleback or disc of banded slate. So far as we can determine it, the process of manufacture observed in the specimens of the Phillips Academy collection is singularly similar, both in detail and in general.

The artisan selected a brightly colored bit of slate, shale, granite, or sandstone. For his ornamental stones he regarded as of prime importance *color* rather than whether the stone was workable or not. It is to be noted, therefore, that he has followed precisely a different policy from that which influenced him when he selected the material out of which to chip arrow and spear points, or knives. As the slates and the shales are soft, he had less difficulty in his work than that experienced in making axes, or hematite objects. Yet, when his ornament or ceremonial was near completion, there was greater danger of breakage because of the brittleness of the material.

In Pl. IX are illustrated three oval discs, two of them from Ohio, and the one to the left (1992) from Martin's Creek, Pennsylvania. The larger two are of banded slate, the smallest of plain green slate. All three show the first stage of manufacture, the rough surfaces resulting from the use of the hand hammer. In brief, these specimens are not dissimilar from the first stage workmanship observed in the making of large flint knives or spades. It is unnecessary in this paper to follow the evolution step by step from so crude a beginning to the completed form. Therefore, we shall pass at once to a consideration of the ten divisions into which we have divided the stone "gorgets" of the United States.

Class 1, the spade-shaped. These are shown in pl. X, figs. 1 and 2 (Nos. 35354 and 35355). The points vary in degree, some are rounded and others nearly square. These two hang with point downward, when suspended, but there are some specimens of this type perforated so near the centre that they hang with the point upwards. There is no sign of wearing noted in the perforations; those illustrated are from northern Ohio.

Class 2 comprises possibly the largest number of "gorgets". It is rather difficult to establish a line of demarcation between Classes 2, 3, and 5. It is easy to distinguish the extremes, but many of the specimens are not extreme, and it depends upon the personal point of view how they should be divided.

Pl. X, fig. 3, comes under the head of sub-division "A", the sides being concave. This is a common form of ornament or tablet, and is found sometimes in mounds. The wearing is not upon the smoother side, but upon the slightly oval surface, and is on the edges of the perforations nearest each other.

Pl. X, specimen No. 2048, Class 2 B (ovate, sides straight), is a little double perforated ornament of steatite. It seems southern rather than northern in character, and may account for the presence of a raiding party from the South We can imagine that this is a typical button, because the space between the two perforations is not only grooved but worn entirely smooth. As some writers have assumed that perforations in an object indicated suspension, No. 2048 indicates that such opinions may be erroneous.

Pl. X, fig. 5, comes under subdivision "C", sides convex, and is peculiar in that it has three perforations. Why it should be so perforated must remain a mystery. There are slight evidences of wearing.

Pl. XI, fig 1, of specimen No. 38609, another convex object with two perforations. This sheds some light on Pl. X. One observes, after much study, that most of the convex "gorgets" in Class 2 are perforated both at one end and a trifle below the centre, and that the majority of specimens are so perforated rather than at each end. Therefore it is clear that fig. 1 in Pl X may have been subsequently perforated near the second end. In fact, there is slight wearing between the earlier two perforations, whereas the later and smaller perforation shows no indications of wearing.

Contrasted to the above is Pl. XI, fig. 2, specimen No. 36259, a crude affair of sandstone, not polished, and perforated near either end. Made by a very poor workman — or shall one say a beginner in stone art or by a boy? The object may not have been entirely finished, but it is hardly proper to say it was finished, as further work would destroy the perforation at the thin end. Moreover, most of the specimens are first fashioned and then perforated. As the perforating was more or less a delicate operation and one requiring skill, it was reserved until the object was very nearly completed.

Pl. XI, fig. 3, Class 2 C, is an ordinary ornament with seven incised lines on each side, near the ends. About one specimen in a hundred has some kind of markings upon one surface or both. Whether these represent the caprice of the owner or are records is, of course, purely theoretical.

Pl. XI, fig. 4 (1 and 2), portrays both sides of a remarkable "gorget" quite different from anything we have observed in other museums. It is perforated at either end, of granite with bright white and gray bands of quartz. The perforations show no evidence of wearing.*

Class 3, leaf-shaped. In most of these the ends are pointed, but not sharp, the sides convex. Occasionally they occur where the sides are irregular. Perforations vary. Usually there are two, one on either side of the greater diameter.

No. 35357, of which drawing is presented, Pl. XII, fig. 1, is interesting. It is composed of a reddish sandstone with a broad green band running through the centre. It became broken and was perforated subsequently on either side near the top and worn as an ordinary pendant. The pointed end is smoother than the other surfaces. On one side there are twenty-one notches, on the other twenty-three can be counted, and as the end is slightly battered several are obliterated. The notches are filled with patina and appear old.

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* Since ascertained that this is an elaborate Eskimo sinker, from Cape Nome, Alaska.

No. 38576, shown in Pl. XII, fig. 2, is of fine-grained reddish sandstone, and sharper at one end than at the other. The perforations show no signs of wearing.

In New England a few "gorgets" are found. One specimen made of micaceous schist, has on one side two unfinished perforations, the larger one being sunk half way through the stone.

Two specimens observed were of nearly the same size. But there was a difference of nearly 11 MM. in thickness. One, very light; the other, heavy. Both were well made. The perforations in one 28 MM. apart; in the other, 33 MM. distant. Were these objects used for identical purposes?

Class 4, the spear-shaped, may represent the primitive form from which Class 2 was developed. Or, Class 2 may have been first made and Class 4 subsequently. Having made Class 4, Class 1 may have followed as a logical development.

Class 4, spear-shaped, has one end square, one pointed, and is difficult sometimes to distinguish from Class 8. Pl. XII, fig. 3, is reproduced from the drawing of No. 38540, from Indiana. It is of banded green slate, well polished. There is a slight indication of wearing on the side of the perforations nearest the centre.

Pl. XII, fig. 4 (a and b), shows two other specimens of this type, but they present marked contrast, as the perforation is in the square end in the one and at the pointed end in the other. That one or both of these two may have been pendants, one may concede, but because of the location of the perforation, one specimen hangs with the point down and the other with the point up.

Pl. XIII, fig. 1, is a beautiful "gorget" in brown banded slate, the bands being particularly clear and distinct. The specimen sheds some light on the use of the "gorget". Naturally, an observer would conclude that it was worn (if worn) with the rounded end upwards and the point downwards, but the wearing — distinct at the apex of the perforation near the pointed end — is distinctly at the top. By turning the specimen in the proper angle toward the light, one can observe the wear of the stone for 5 MM. above the perforation. Therefore this specimen is important in that it at once renders valueless our preconceived notion that it was suspended with the point downward. But it is of greater importance in that it shows that if we are to class all of these as pendants, we are, doubtless, in error; and that detailed study of other "gorgets" may reveal further and new information.

Class 5. The rectangular comprise a large number of the ornamental "gorget" classes. Why were so many of them fashioned in this shape? Probably because, as most pebbles are oval, the maker wished to depart from the simplest form and producd something more complex. To avoid work all he need do was to perforate a stone and consider it an ornament. To illustrate properly the multitudinous variations would necessitate more figures than space permits.

In Pl. XIII, fig. 2, are shown twenty-four "gorgets" from the Work Collection, central Indiana. This presents a fair average (in condensed form) of any museum exhibit. It will be seen that the rectangular (Class 5) constitutes seven or possibly eight of the specimens; that six may be put under the ovate (Class 2), and that the others fall into several divisions.

Class 5, Division "A". This embodies the tablet class, generally well made and graceful and sometimes quite thin. Until a more suitable term be invented, tablet may stand. In Arizona specimens not unlike the two central objects in figure 2 are found. They are never perforated, but the surfaces are depressed and there are circular scratches, etc. Cushing said that on the Arizona slate tablets, ceremonial paint was mixed. Such a purpose cannot be assigned to the Mississippi Valley forms. But they probably were more than mere "gorgets". The museum of Phillips Academy contains many of them. In the centre of figure 2 to the left is a typical specimen. This type is occasionally found in mounds.

Pl. XIII, fig. 3, of specimen No. 35346, shows the object one-half size. This was originally a large, long tablet or ornament. Traces of the breaks at either end were carefully obliterated by grinding and the specimen made extremely concave and perforated. The proportions are not as exact as in other specimens of this class.

Pl. XIII, fig. 4, portrays a tablet with sides not quite concave and yet not straight.

The more one studies these things, the more one is convinced of their great antiquity. This is illustrated in Pl. XIV, fig. 1, of specimen No. 35389. After the specimen was broken it was used as an ornament, and the edges of the fracture are worn smooth by long continued use. In the centre, near the top, the aborigines began to drill a second perforation, but abandoned the work.

Pl. XIV, fig. 2, presents another of Division "A" from Muscatine, Iowa, and a still different form.

In subdivision "B" we have one specimen, No. 35376, with eight notches at the top. These are of various depths and widths. The ridges as well as the depressions are all polished. Such stones may have served a double purpose, but whether the notches at the top are for utility or merely ornamental is problematical.

Pl. XIV, fig. 3, of specimen No. 35098, exhibits this subdivision.

Specimen No. 38606 is about two-thirds the size that of Pl. XIV, fig. 3. It is perforated at the top, but the wearing is on the left side of the perforation on one side of the specimen and on the right side in the other. This indicates a curious method of fastening. If two strings were not used — for it would be impossible for one string to wear the stone in such fashion — an intricate and unusual method of fastening was employed.

Pl. XIV, fig. 4, exemplifies a "gorget" of Division "B" somewhat larger than the average.

Pl. XIV, fig. 5, No. 35420, is an illustration of the ornament of Class 5, C, (sides convex) broken and made serviceable again. Originally, there were two perforations equidistant from the centre. After the break occurred, the artisan ground off the irregular, broken edge, made two perforations at the top, and made use of the ornament. The lower perforation was then superfluous. To suggest theoretically, he might have inserted a string and tied a small bunch of feathers on this part of the stone; or he may have done any one of fifty things with it.

On the large slate ornaments it occurs to one that the aborigines may have painted their totems, or a certain cosmic symbol. The surfaces are suitable for such a purpose. That so large a surface has been prepared for no purpose whatsoever — beyond the dressing done to the ornament — seems improbable. Why should he need so large a smooth surface — the surface produced through expenditure and time — unless he wished that surface as a background for decorations or symbols?

Class 6, the ridged, approaches the boat-shaped. Pl. XIV, fig. 6, shows two of these specimens of nearly the same form, reverse of one and the face of the other. It will be observed that on one of them the bands of the stone run parallel to the greater diameter and on the other the opposite is true.

Pl. XV, fig. 1, presents specimen No. 35345. It is both peculiar and interesting. Between the two perforations on the elevated side, strings or cords have worn a depression. On the other side there is a plain indication of wearing, on the edge of one perforation. If this specimen had been suspended by means of a cord through that particular perforation, there would also be wearing on the opposite edge or rim at the same point.

Pl. XV, fig. 2, illustrates a fine ridged "gorget". Between figures 1 and 2 there is yet another type somewhat different from both; a broad, shorter, boat-shaped object. In fact, it is just the shape of an ordinary "scow". It is usually of sandstone and such specimens as are exhibited here, show no signs of wearing. No. 35478 is perforated at either end, whereas No. 35474 is perforated on each side of the point. No suggestions can be offered as to the use to which these were put.

Class 7, the "expanded centre". Specimens are not very numerous; they are of several types; all of which are shown in Pl. XV, fig. 3 (a, b and c). Whether specimens more slender than these should be considered as belonging to this class or not depends upon the personality of the observer. Some he would put in the rectangular class, others he would not. Long, chisel-like forms may properly be excluded from the "gorget" family.

In Pl. XV, fig. 3, the most striking is No. 35245, which is flat underneath and elevated above. The expansion is really in three directions. This object is more or less like the crude human figure. Another observer might consider it bodkin-shaped. If very ancient it may indicate the development (beginning) of the conception of effigy carving.

Class 8, shield-shaped. Two shield-shaped "gorgets" are shown in Pl. XVI, fig. 1 (a and b). This class is of infinite variety. In many books are pictures of "gorgets" hung about the neck by a single perforation. If one experiments with a "gorget" and inserts a string and wears it dangling upon the chest, it will swing about scarcely more than would a "gorget" of shell or metal or any other substance. But the bulk of them are hardly for suspension about the neck, and those with two perforations can scarcely be classed as such. One of the double perforations is superfluous for such purpose, and those grooved at either end may at once be set aside as worn in an entirely different manner. Many of them may have been used as ornaments, taking the place of buttons in fastening of fur coats, mantles, blankets, and so forth. This theory is not untenable when one considers that the modern button is the descendant of a large and grotesque disc. On military cloaks and other decorative garments, even down to the present time, the fastenings are much larger and more ostentatious than necessity requires.

Class 9, pendants. The celt-shape is rather common, and is usually very simple in form. It ranges from the diminutive objects even smaller than Pl. XVI, fig. 2, to such a size that one may well hesitate before classifying under the heading of pendants.

Division "B", rectangular, comprises the larger pendants. One of these is shown to the left in Pl. XVI, fig. 3 (a, b and c). It has incised lines about the perforation.

Division "C" is the most numerous, and to it should be added the irregular pendants.

In Arizona along the Salado many small pendants of shale, mica schist, black slate, etc., are found. One of these is illustrated in Pl. XVI, fig. 3 b. They may be nose or ear ornaments, or they may have been on a string in company with other things about the neck of the user. The true "gorgets" and ceremonials are not found in the Cliff country or the southwest.

Pl. XVI, fig. 4, Class 9, C. "Gorget" from Oxford County, Ontario. The teeth at the lower edge are cut diagonally to the major axis.

Pl. XVI, fig. 5, Class 9, C. A "bangle" or "ear-drop" of huronian slate, from Oxford County, Ontario.

In the Andover collection are a large oval pendant of soft hematite, several of granite, earrings of black graphite slate, cannel coal, etc.; also a small pendant of talc. This was found on the banks of the Miami river. It may be modern.

Pl. XVII, fig. 1, exemplifies a broken winged-perforated stone made into a pendant.

Pl. XVII, fig. 2 (a and b), presents two specimens from Ross County, Ohio, of circular form and probably worn as pendants.

The circular pendant or "gorget" is exceedingly rare. While "gorgets" are frequently made in shell and circular ornaments occasionally in copper, yet in stone are but few. No. 35476, Pl. XVII, fig. 2 b, is of fine grained sandstone. The under surface is flat, the upper surface slightly convex with a decoration of a rude circle 38 MM. in diameter. From the outer edge to near the centre are thirteen straight lines.

Class 10, unusual, odd. There are a great many specimens to be put in this division. Some different observers might put in other divisions.

Pl. XVII, fig. 3 (a and b), represents specimen No. 35200. It is classed as a pendant of rare form. It illustrates how often use was made of broken material. It is quite evident that this was originally a large "gorget". After an accident made it worthless in its original form, the workman ground off the rough or broken edge, grooved it — which is unusual — perforated the ornament in the centre on either side and made three notches at one end, grinding the other end to a point. The groove is exceedingly well polished.

Pl. XVIII, fig. 1, (No. 14006) is made of hematite. It is remarkable in that both ends are decorated by notches. On the upper end there are eleven notches or incised lines; on the lower or broad end there are fourteen lines. This specimen is not a type but an anomaly. It is of heavy, pure hematite and not of stone discolored by iron oxide as are many of the ornaments. It was extremely difficult to work because of the density and hardness of the material. Aside from these facts this form is peculiar. The edges are slightly beveled. The specimen shows unmistakable evidence of antiquity because of patina, and the cuttings (striae) are irregular and have been made with flint and not with steel.

It is worthy of remark in passing that, so far as can be determined, none of the specimens illustrated or mentioned in this report have been worked with steel tools.

No. 35455 is unfinished, of banded slate, almost pyramidal in form, the upper surface being about two-thirds the diameter of the lower. A few smaller than this are found finished and are perforated in the centre, and this specimen is slightly hollowed and very smooth on the under surface.

Pl. XVIII, fig. 2 a, No. 35392, may have been fashioned from a larger and broken ornament. Certainly it is unique. On either side of the perforation are shoulders and the depressions in these are quite well polished. There is a notch in the small end. This notch may be half of the former perforation. It is also observed that the sides of the narrow end above these shoulders are far more polished than the other sides and the broad base. How the object could be mounted or fastened so that the polish is confined to the narrow and sloping sides, must, for the present at least, remain a mystery.

Pl. XVIII, fig. 2 b, (No. 35352) is unfinished, although perforated. It is of the same general form as No. 35392, if not polished, and plainly shows scratches of the flint or other cutting tool. Class 5 includes the tablets that were square at either end, but there are some tablets that are concave on all four sides. Possibly these should be placed in the unusual class. There are several in the museum, and they do not vary in thickness or material from the specimen illustrated in Pl. XVII, fig. 3.

A specimen from New England, No. 18415, is straight on one edge and oval above. There are two perforations, one at the top and the other at the cutting side. Cutting edge is said advisedly, for the object was once a woman's knife of the prevailing New England type, and was subsequently made into a "gorget". One perforation might signify that she tied the knife to her belt, but two perforations make this theory less likely.

BROKEN AND WORKED "GORGETS".

When one studies this class one learns quite as much through consideration of the perfect forms alone.

No. 36263 was originally a banner or butterfly ceremonial. It was broken — whether by accident or design one may not say. But having been broken, it was drilled through the centre, near the lateral perforation, and worn as an ornament. Centre drilling was done with a reed drill. There are other specimens in the collection at Phillips Academy that have been broken and made use of as ornaments. It is probable that in not a few instances these specimens have been found by subsequent tribes or individuals, and made use of for a purpose entirely foreign to the original maker. This fact is illustrated in specimen No. 38205, which has a remarkable and interesting history. It was found in Indiana on the banks of the Wabash river, on the site of the Miami Indian village. The Miamis lived on that site about fifty years ago, and the specimen was found shortly after they departed for their reservation west of the Mississippi.

As will be seen in Pl. XIX, fig. 1, the object is an unfinished ceremonial, or possibly an ornament. Material, banded slate. The maker had done little more than roughly to block it out. The specimen is clearly prehistoric and is covered with patina. It has every appearance of age.

It was picked up from its ancient site by some Miami Indian who was in search of a suitable instrument for tapping sugar trees. As the specimen was of the right weight, and shaped something like a hammer head, he lashed it in a stick and used it as an instrument with which to drive pegs or chips into the sugar maples. The original handle has been preserved.

Moreover, the specimen carries a moral. We cannot explain the purpose of the "ceremonial" or unknown or "problematical" class through information or data obtained from modern Indians, and so far as prehistoric times are concerned, modern folk lore sheds little light on them. Here was an Indian who made use of an unfinished ceremonial. How long ago that ceremonial was manufactured, it is impossible to determine. One fact stands forth indisputable, and that is that the modern Miami had not the faintest conception of the original or true import of the object he used as a hammer.

Pl. XIX, fig. 2, shows No. 25282, a perforated steatite object from Ohio. It has been broken and afterwards worn as an ornament. The former perforations show on either end. Steatite being foreign to Ohio may account for the fact that so rude an implement had been again made use of as an ornament. It was originally rather long, possibly over one hundred MM.

In the Phillips collection are three interesting broken "gorgets". Pl. XIX, fig. 3, of one of them may stand for all. In each instance the maker has attempted to repair it, but it is also quite evident that he drilled an additional perforation in order that he might suspend it. Had he wished them to hang with the heavier part downwards he would have drilled in the small or narrow end rather than on either side of the broad end. Moreover, the drilling is where the break occurred, and in one instance, No. 35483, the specimen was once more broken where the repair was made. This indicates that these things were greatly prized, and the information is of no small value in the study of archaeology.

Because of its unusual high polish and slightly oval surface, we cannot well illustrate No. 39544, which was found by Clarence B. Moore in Washington County, Florida, in 1902. This is a remarkable specimen, and although it is set down as having one surface flat and the other convex, it would be more accurate to say that the flat or upper surface is slightly hollow. The entire specimen is highly polished, so much so that it has a glossy appearance. The specimen is broken. After breaking it has been used, possibly by later Indians, for smoothing the sinews or similar purposes, as there are grooves worn across its larger diameter. These grooves almost obliterate the perforation. It is possible, but not probable, that the specimen was a pipe of the monitor type. There is a raised circular line still traceable, and this was originally 25 MM. in diameter. As this is in the centre of the object at the broken end, where the specimen is 11 MM. thick, it is possible that this may have been the base of the bowl.

No. 25268, Pl. XIX, fig. 4, is half of a winged and perforated or butterfly shaped stone. Becoming broken the maker ground it until traces of the centre perforation had disappeared. Then he perforated the stone on either side after the manner of the bird or saddle stone. One should note that the stone is more polished on either side of the perforation.

No. 18144, Pl. XIX, fig. 5, was at first a winged-perforated butterfly ceremonial. It was broken long ago, and the Indian who found it drilled it at the top and wore it as an ornament. All the edges and perforations carry patina and evince great age. This is a very old specimen, and we may construct theories that the second tribe made of it an entirely different object than than intended through the workmanship of the first.

No. 25011, Pl. XIX,, fig. 6, is a broken "gorget" of curious, mottled stone. There were two perforations, one on either side of the centre. The one that remains shows unmistakable wearing in the perforation. The specimen is not a work of art, but it is one of the most important in this entire series, if not in the entire museum, because it clearly and positively indicates that two strings were put through the opening, and the wearing is on such side of the perforation as could come from two strings and not from one. The wearing is at the right of the perforation on one side, and at the left of it on the other. Further, the specimen was worn across the body or at least tied across something rather than in a vertical position; the thong or cord slipped and caused the wearing. To the suggestion that the specimen should show wearing on four sides of the perforation rather than on two, it may be remarked that the string while flat and tight against one flat surface was tied to something on the other side that elevated or brought it out more from the perforation. Possibly this may seem ambiguous, but if one experiments with strings, as has been done, he will observe that it is impossible for one string to cause the wearings indicated. One string drawn back and forth will cause a polish on the edges of the perforation at the same places on either side. These are details and tedious at best, but by means of them facts can be got hold of heretofore unobserved or unknown.

The more one studies these objects the firmer becomes the conviction that the term "gorget", as applied to some of them as a class, is misleading or even more than misleading. That most of them are "gorgets" one may not deny. That a lesser number are not "gorgets" we are free to affirm; that the bulk of them one cannot positively assign to this purpose or that purpose is quite probable.

The study indicated in the description of these various specimens is based on the Collections in the Peabody Museum, the Phillips Academy Museum, and previous studies on the same types in the joint museums of the University and Historical Society of Columbus, together with extensive reading. As to the examination of the individual specimens, a number show wearing in such a manner as to preclude the idea of suspension as "gorgets", as this term is understood. Now the term "gorget" indicates an ornament of one type or another suspended about the neck or upon the chest. The wearing in such place as has been noted could only have resulted from the tying of these specimens or the fastening of them with two, three, or even four strings, each stretched to a tension so as to hold the object firmly. The wearing would naturally occur at very different points than would be in evidence if the object was simply suspended by means of one string. Again, the form, in instances, precludes the idea of the "gorget".

Certain forms, from their positions on skeletons in burial places or by means of reliable evidence on the part of travelers, one can safely call ornamental "gorgets".* But in these the

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* Moorehead found more of them on prehistoric sites than on Shawano or Delaware sites in the Ohio Valley. From the surface of South Fort (Fort Ancient, Warren Co., Ohio,) he collected one rectangular "gorget" with straight sides and two perforations; one oval, with two perforations; one concave -- two perforations; one rectangular pendant, straight sides, one perforation. (p. 111, *Ft. Ancient.*)

In graves within the South Fort, he found two pendant shaped "gorgets" among human bones (decayed). One perforation near the end of each "gorget".

In the Coiner Mound, 3 miles east of Frankfort, Ohio, a diamond-shaped outline of form is chiefly of the pendant, the expanded center, the ridged and the octagonal outline.

Reference has been made to these ornaments made of broken ceremonials or broken "gorgets". It seems that they may mean more than what is implied in the simple statement that a broken ornament was remade into a serviceable ornament. That the following is probable, it is not claimed, but the assertion is ventured that it is possible. Since on becoming broken they are afterwards made into entirely different objects in shape, is it not possible that in their original form they were made and used by a much earlier tribe? That they were found upon the surface by later natives and were fashioned by them into such ornaments as are common upon sites occupied in comparatively recent times. If this is not so, why do all the broken stones, when re-fashioned, take the form of ornaments different from those found generally throughout the country? If may be offered as a suggestion that the original form was a design

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"gorget" was found under the head of a skeleton. (*Prim. Man in Ohio*, p. 131.)

Three miles down the Scioto river from Chillicothe in the Redman mound were found these "gorgets": —

One with expanded center, two perf., with skeleton.

One broad, with concave sides, two perf., and under head of skeleton. Both of slate. (*Prim. Man*, p. 157.)

With skeleton No. 278, in the Hopewell Group (1891), lay a "gorget" of cannel coal.

The Storey Mound, west of Chillicothe, shed some light upon the "gorget" class. On the right wrist of a skeleton was found a fine expanded-center "gorget" of ribbon slate, with two perf. On the left wrist, one of the same kind, but not perf. Also at the left wrist, a concave one with unusually sharp edges. Report of *The Ohio State Arch. and Hist. Socy.*, Vol. VII, p. 134.

In the Roberts Mound, Perry County, O., was found a "gorget" injured by fire. It was thick, expanded center, and two perf. and lay amid the remains of a cremated skeleton.

At the Corwin Mound, 1½ miles north of Waverly, O., a curious thick stratum of soft, black substance lay upon the base line. In this were several objects of the "problematical" class. One, of galena, two perf. and almost boat-shaped, may be included with "gorgets". *Report O. S. A. and H. Socy.*, Vol. VII, p. 161.

At Beavertown, O., in a mound, the same survey discovered another slate "gorget" with straight sides and two perf.

common to the tribe that made them. Becoming broken they were cast aside. Subsequent individuals or tribes made quite differently shaped "gorgets", and accordingly changed the broken "gorget" of their predecessors to the pattern that best suited them.

It is interesting to note—and one is persuaded that it has a direct bearing upon the usages to which the aborigines put these objects—that few of the forms are found accompanying the burials, and that these few are confined to the pendant shape, the tablet, and the "boat-shaped"—not hollowed out. That is, that the "canoe-form" is so seldom found in interments as to be considered an exception, and that even when found it is not hollowed out.

Certain forms are common in stated localities. When one has time to list all of the "gorget" class now on exhibition in the museums, it will be possible to deduce further conclusions. Until then, what facts have already been ascertained must suffice.

Cushing thought that many of these slate and granite "gorgets" were bases on which bird-stones and similar effigies were mounted. Formerly one of the writers was inclined to accept Cushing's views, but as careful study of the soft slate surfaces fail to reveal scratches, he is not now prepared to accept his suggestion. Rather let it be said that, if one is to theorize at all, the more complicated of these "gorgets" belong to the shamanistic individuals who were numerous in primitive tribes; that these, adorned by variety of feathers and gew-gaws, were brought before the lodge or into the central dance ground and placed before the shaman, or that they were carried by him, or worn upon his person.

If one were to find Zuñi paraphernalia independent of any association of Zuñi people, and if the discoverer had no knowledge of the Zuñis, he could not conceive of the peculiar, not to say incredible, usages to which Zuñi charms are put. The Zuñis gave up most of their time to ceremonies. Other native tribes may have done the same.

In the earlier Jesuit relations the natives are said to have devoted many days to ceremonies, incantations, etc.,—"works of the Devil". But there is no clear and tangible reference in all of the voluminous writings of early explorers, to the more complicated "gorgets", to the forms more elaborate than the merely pendant shape. The suggestion forces itself that these objects were made and used before the Discovery by Columbus.

The conclusions reached then through a study of physical characteristics, of analogies and the opinions of scholars and of specimens, prevent a dogmatic assertion that "gorgets" were used for any one single purpose at any one single time. The several purposes most probable are those of ornament for the neck with added superstitious significance, of bracers for the left wrist, and twine twisters, of forms for the hair, and of netting implements; in addition, the unknown uses may, in spite of all effort, still claim many of these simple, baffling results of prehistoric labor.

DESCRIPTION OF PLATES.

PLATE I.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
Line 1, left to right.	1	Peabody 20644	1.	10.	Ohio	With four striated notches.
	2 Upper	Peabody 56056	2. B.	10.	W. Va.	
	3 Lower	Peabody 56066	2. C.	5.5	W. Va.	With a groove between perfs. on both faces. Cf. Pl. X. 4 and Pl. XV. 1.
Line 2.	4	Peabody 20775	3.	9.	Ohio	
	5	Peabody 38837	4.	11.	Mich.	With notches near squared end.

PLATE II.

Line 1.	1	Peabody 20860	5. A.	9.5	Ohio	
Line 2, left to right.	2	Peabody 15678	5. B.	13.5	Ohio	
	3	Peabody 15629	5. C.	13.5	Ohio	
Line 3.	4	Peabody 20741	6.	15.	Ohio	With wearing from perfs. parallel to major axis, flatter face.

PLATE III.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
Line 1, left to right.	1	Peabody 20641	7.	9.5	Ohio	With one end broken, one end flattened. (Also found on No. 20642, Cl. 7).
	2	Peabody 20861	8.	9.	Ohio	With wearing at left of figure.
Line 2.	3	Peabody 20753	9. A.	10.5	Ohio	
	4	Peabody 20852	9. B.	11.	Ohio	Perforation 4 mm. from end.
	5	Peabody 20765	9. C.	5.5 x 5.25	Ohio	With complete notching.

PLATE IV.—Size 1:1.

Line 1, left to right.	1	Peabody 65659	2. C.	7.	N. J.	Cf. p. 72.
	2	Peabody 11609	9. A.	6.5	N. J.	Cf. p. 72. With wearing on decorated face.
Line 2.	3	Peabody 11595	9. C.	6. x 6.	N. J.	Cf. p. 72. With Pl. IV cf. Abbott *Stone Age* in N. J., fig. 167, and *Prim. Inds.*, figs. 363 and 368. Ch. XXVII, pp. 377 ff.

PLATE V.—Size 1:1.

Top to bottom.	1	Peabody 56055	2. C.	7.	W. Va.	Cf. p. 73.
	2	Peabody 56055	2. C.	7.	W. Va.	Cf. p. 73. Side view of fig. 1.
	4	Peabody 2685	2. C.	5.5	Mass.	Cf. p. 73.

PLALE VI.—Size 1:1.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
Left.	1	Peabody 564	?	18.	N. H.	Cf. p. 73. "Perforated stone (for cords?") Catl. P. M.
Right.	2	Upper fig. Peabody 36081	5. B.	4.5	Ohio	Cf. p. 73.
	3	Lower fig. Peabody 36082	5. B.	4.5	Ohio	Cf. p. 73.

PLATE VII.—Size 1:1.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
Left.	1	Peabody H. 18	5. B.	11.5	Arizona	Cf. p. 73. Fr. Pueblo de Patricio Surface.
Right.	2	Upper fig. Peabody H. 244	9. C.	4.5	Arizona	Cf. p. 73. Fr. Los Hornos. Surface.
	3	Lower fig. Peabody 56537	9. B.	7.	Mass.	Cf. p. 74.

PLATE VIII.—Size 1:1.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
		Peabody 48108		9.5	Canada	Cf. p. 74.

PLATE IX.—Size 1:1.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
Top to bottom.	1	P. A. 1992		10.5	Pa.	Green slate.
	2	P. A. 31049		14.5	Ohio	Banded slate.
	3	P. A. 1989		17.	Ohio	Banded slate. For this plate cf. p. 75.

PLATE X.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
Top to bottom.	1	P. A. 35354	1.	13.	Ohio	Banded slate. Cf. p. 76.
	2	P. A. 35355	1.	11.	Ohio	Gray slate. Cf. p. 76.
	3	P. A. 35329	2. A.	10.	Ind.	Banded slate. Cf. p. 76.
Bottom line, left to right.	4	P. A. 2048	2. B.	6.	Ohio	Steatite. Cf. p. 76. Also cf. Pl. I. 3.
	5	P. A. 35340	2. C.	10.	Ohio	Banded slate. Cf. p. 76.

PLATE XI.

Figures at top.	1	Left P. A. 38609	2. C.	9.	Ohio	Banded slate. Cf. p. 76.
	2	Right P. A. 36259	2. C.	11.	Ind.	Black sandstone. Cf. p. 77.
Reading downward.	3	Weir Collection	2. C.	11.	Iowa	Black slate. Cf. p. 77.
	4a.	P. A. 35476	2. C.	11.	Ohio	Granite. cf. p. 77.
	4b.	P. A. 35476	2. C.	11.	Ohio	4a x 4b obverse and reverse.

PLATE XII.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
Top to bottom.	1	P. A. 35357	3.	11.	Ohio	Sandstone. Cf. p. 77.
	2	P. A. 38576	3.	15.	Ohio	Sandstone. Cf. p. 78.
	3	P. A. 38540	4.	16.	Ind.	Banded slate. Cf. p. 78.
Figures at bottom.	4a.	Left P. A. 38560	4.	8.	Ind.	Banded slate. Cf. p. 78.
	4b.	Right 35399	4.	8.	Ohio	Black slate. Cf. p. 78.

PLATE XIII.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
Top to bottom.	1	P. A. 35092	4.	19.5	Ohio	Banded red slate. Cf. p. 78.
	2					A series from the Work Collection, Indiana. Cf. p. 79.
Bottom Line.	3	Left. P. A. 35346	5. A.	5.5	Mich.	Banded slate. Cf. p. 79.
	4	Right 35324	5. A.	9.	Ohio	Banded slate. Cf. p. 80.

PLATE XVIII.

Top to bottom, left to right.

Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
1	P. A. 14006	10.	9.	Ohio	Hematite. **Cf. p. 83.**
2	P. A. 35352	10.	13.5	Ohio	Grey slate.
3	P. A. 35302	10.		Ohio	Banded slate.
4	35063	10.	10.	Ohia	Sandstone.

PLATE XIX.

Top to bottom, left to right.

1	P. A. 38205	10.	26.	Ind.	Banded slate.
2	P. A. 25282	5. B.	6.5	Ohio	Steatite. **Cf. p. 86.**
3	P. A. 22521	10.	5.	Ky.	Banded slate.
4	P. A. 25268		15.	Mich.	Banded slate.
5	P. A. 18414		4.	Mass.	Granite.
6	P. A. 25011		6.5	Conn. Valley	Shale.

PLATE XVI.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
Line 1. Left to right.	1a.	P. A. 38541	8.	10.	Ohio	Banded slate.
	1b.	P. A. 38547	8.	10.	Ohio	Banded slate.
Line 2	2	35260	9. A.	5.	Ohio	Sandstone.
Line 3.	3a.	38598	9. B.	9.	Ohio	Cf. p. 82. Banded slate.
	3b.	34792	9. A.	8.	Arizona	Mica schist.
	3c.	P. A. 35344	9. A.	10.	Ohio	Black slate.
Line 4.	4		9. C.	8.	Ontario	Striped shale.
	5		9. C.	3.5	Ontario	Huronian slate.

PLATE XVII.

	Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
Top to bottom, left to right.	1	P. A. 35465	?	8.	Ohio	Banded slate. Cf. p. 83.
	2a.	35257		4.	Ohio	Black slate.
	2b.	P. A. 35476		6.5	Ohio	Sandstone. Cf. p. 83.
	3a.	P. A. 35200	10.	10.5	Ohio	Black slate.
	3b.	P. A. 35200				3a and 3b — different views of No. 35200. Cf. p. 83.

PLATE XVIII.

Top to bottom, left to right.

Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
1	P. A. 14006	10.	9.	Ohio	Hematite. Cf. p. 83.
2	P. A. 22252	10.	13.5	Ohio	Grey slate.
3	P. A. 25892	10.		Ohio	Banded slate.
4	25063	10.	10.	Ohio	Sandstone.

PLATE XIX.

Top to bottom, left to right.

Figure.	Mus. No.	Class.	Length Cm.	Where from.	Notes.
1	P. A. [illegible]	[illegible]	[illegible]	[illegible]	Banded slate.
2	P. A. [illegible]	[illegible]	[illegible]	[illegible]	Steatite. Cf. p. 86.
[illegible]	P. A. [illegible]	[illegible]	[illegible]	[illegible]	Banded slate.
[illegible]	P. A. [illegible]		[illegible]	[illegible]	Banded slate.
[illegible]	P. A. [illegible]		4	Mass.	Granite.
[illegible]	P. A. [illegible]		[illegible]	[illegible]	[illegible]

PLATE I.

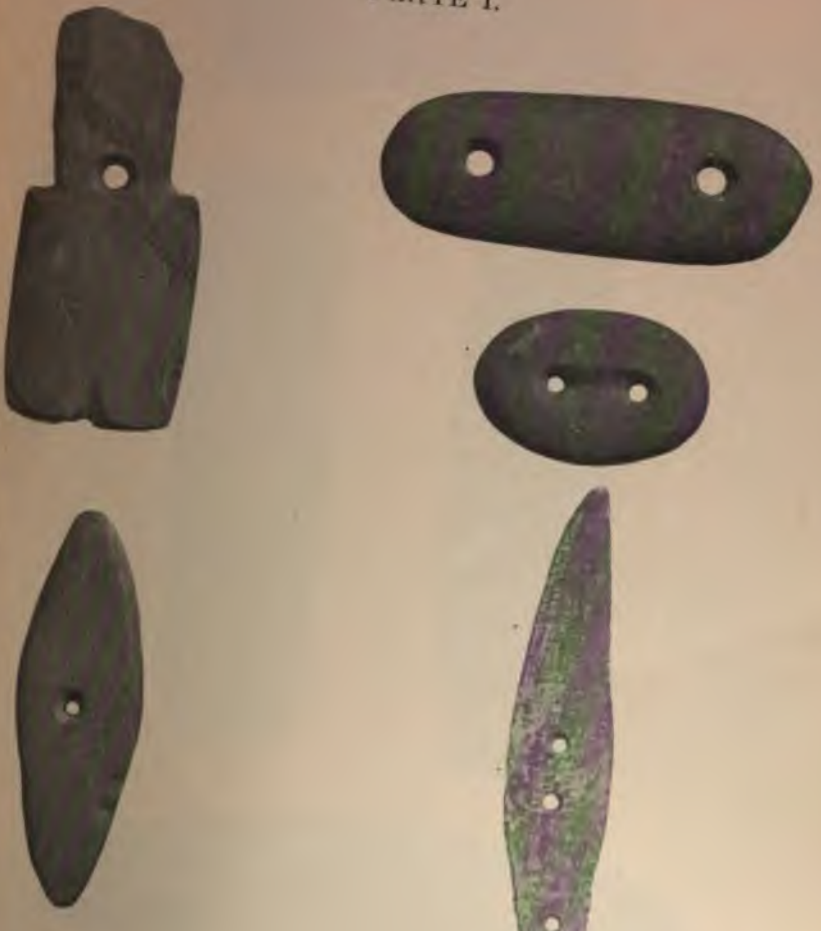

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PLATE II.

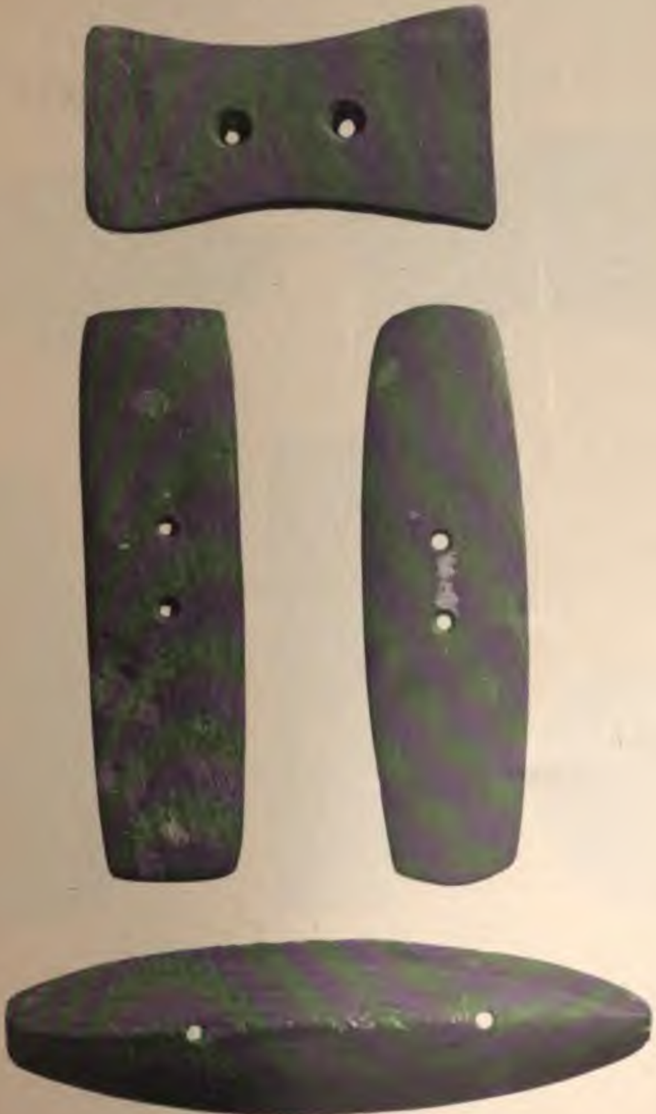

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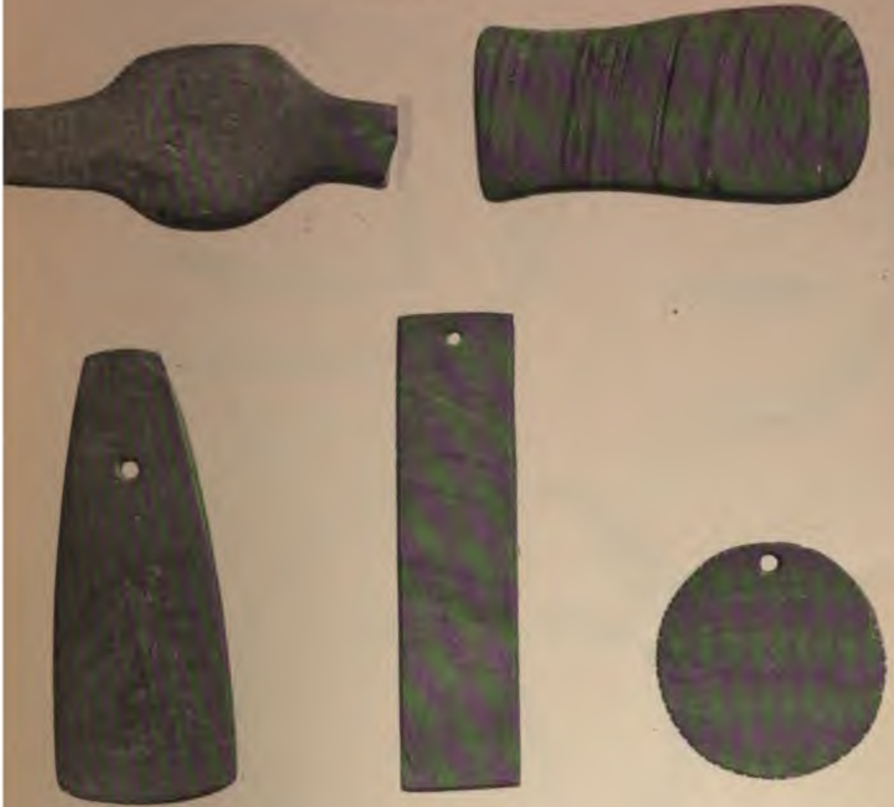
PLATE III



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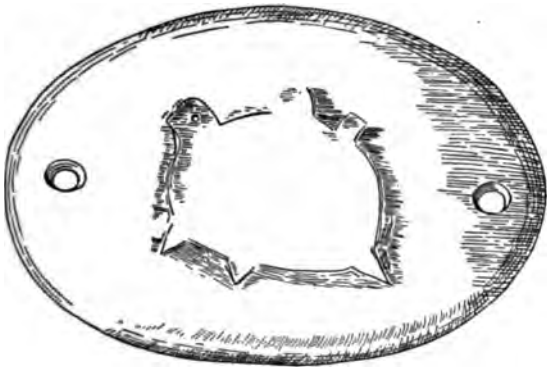

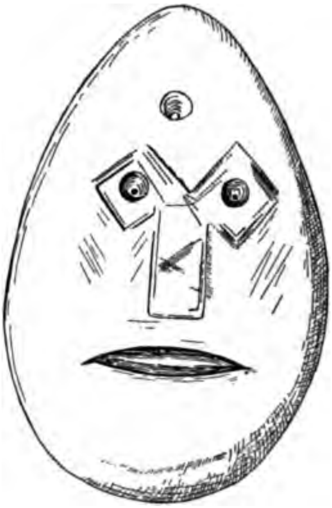

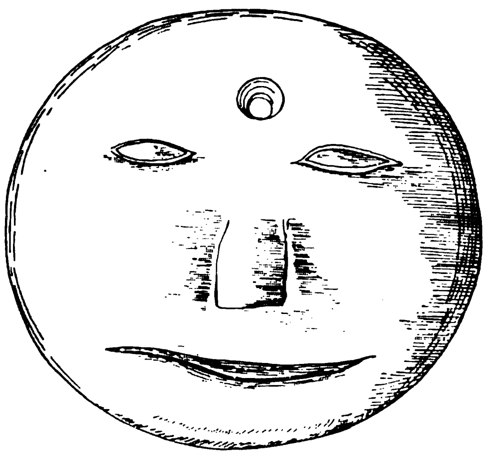

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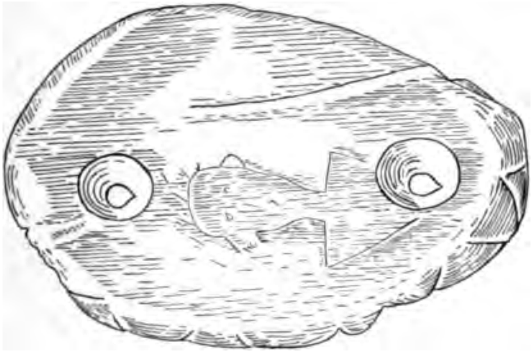

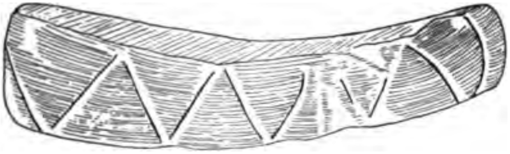

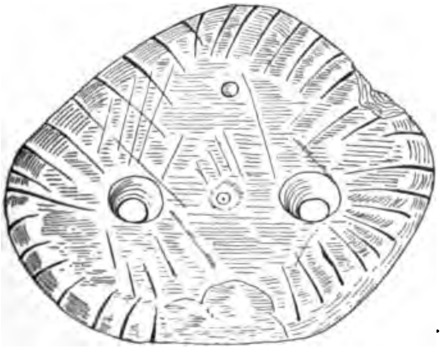

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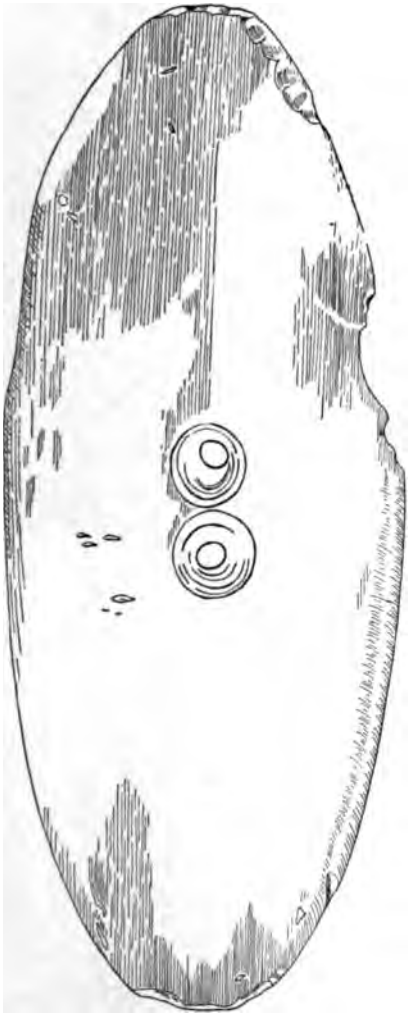

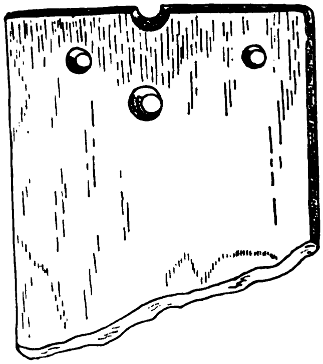

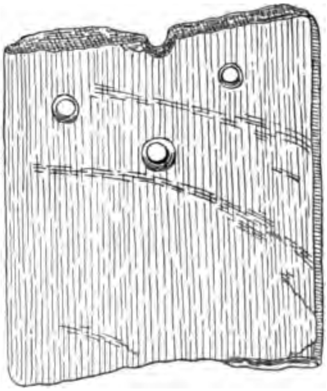

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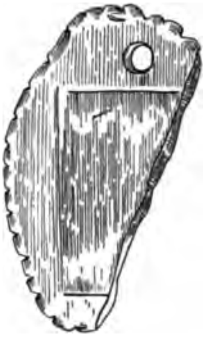

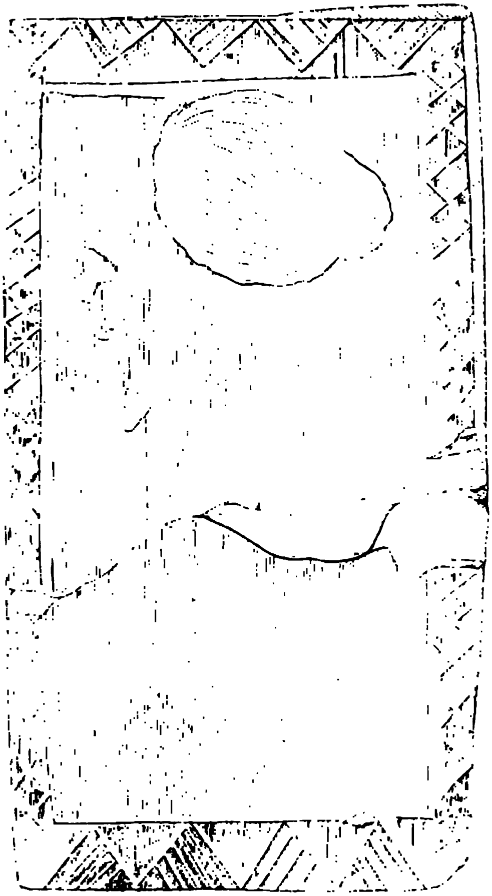

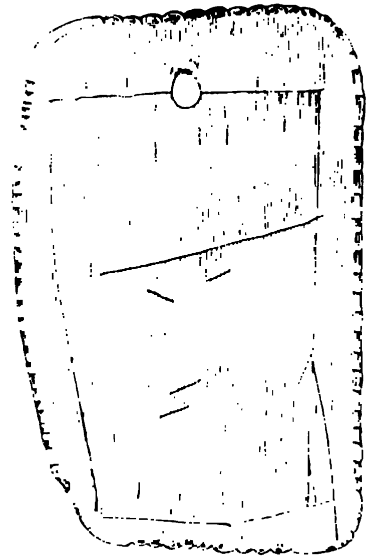

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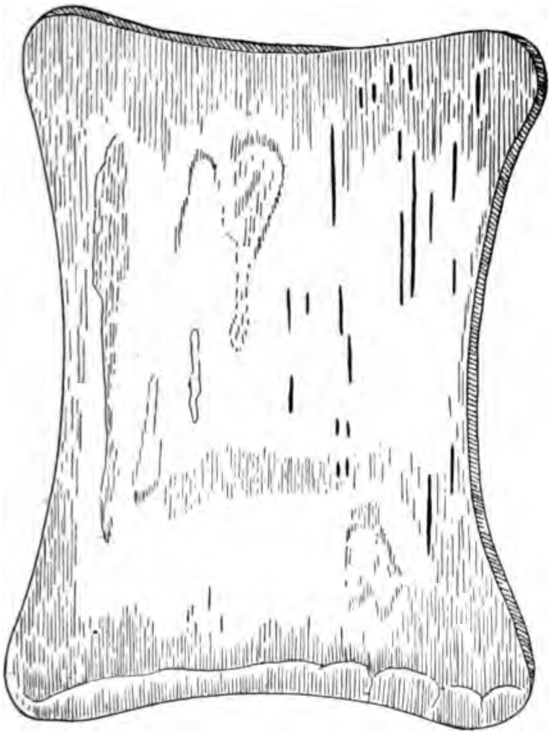

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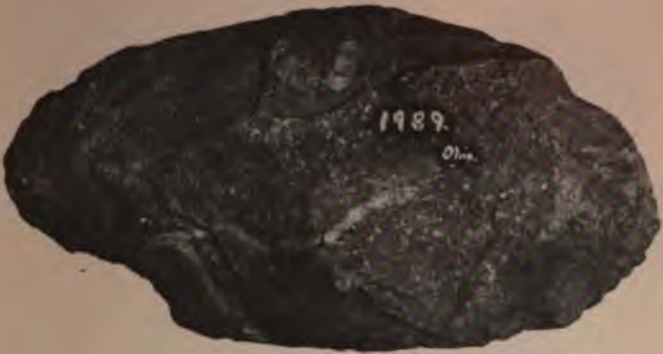
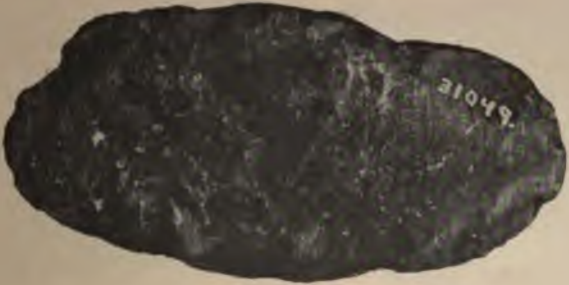
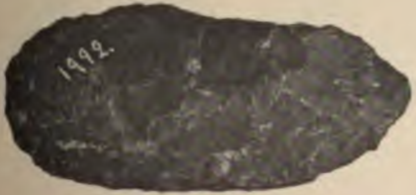
PLATE IX.







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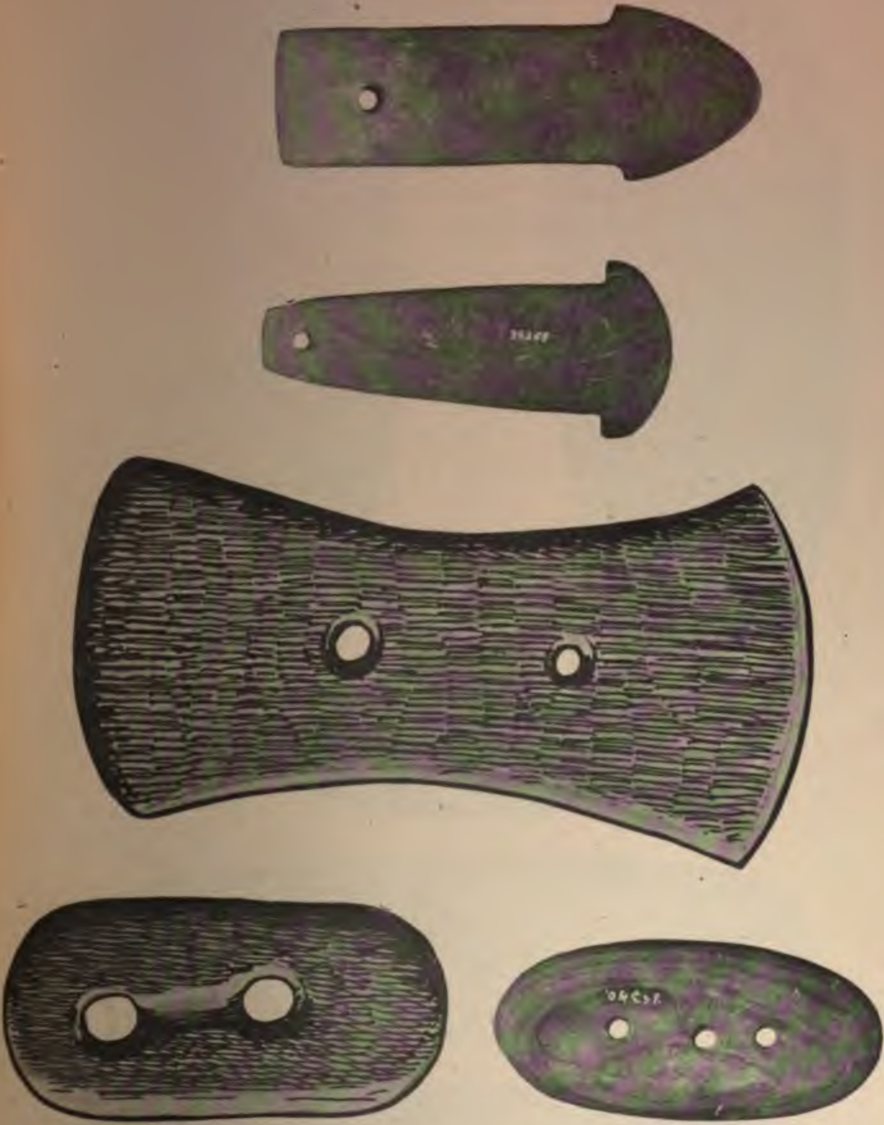

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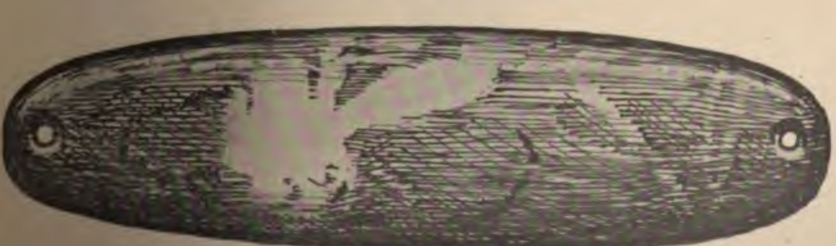

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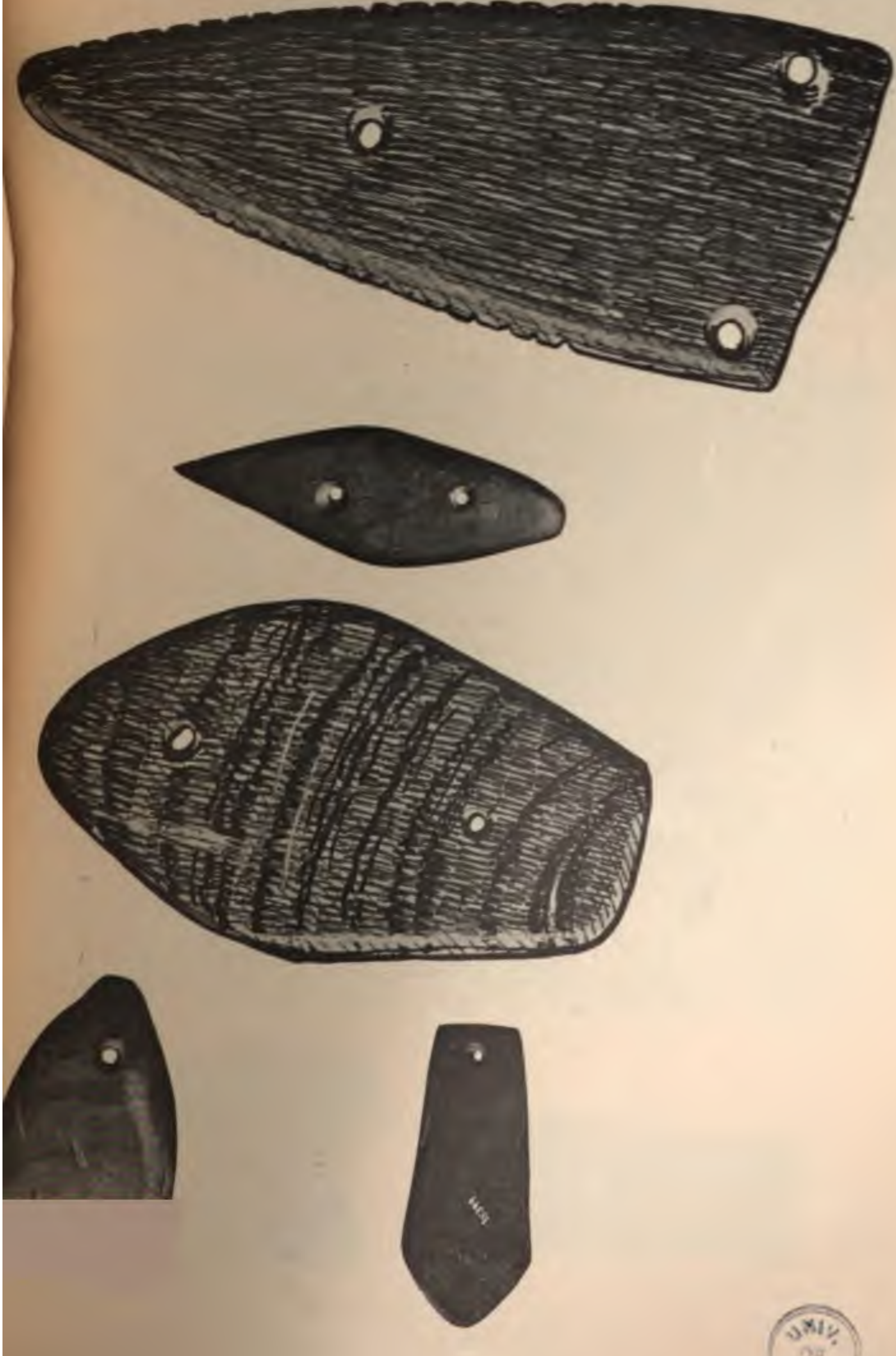

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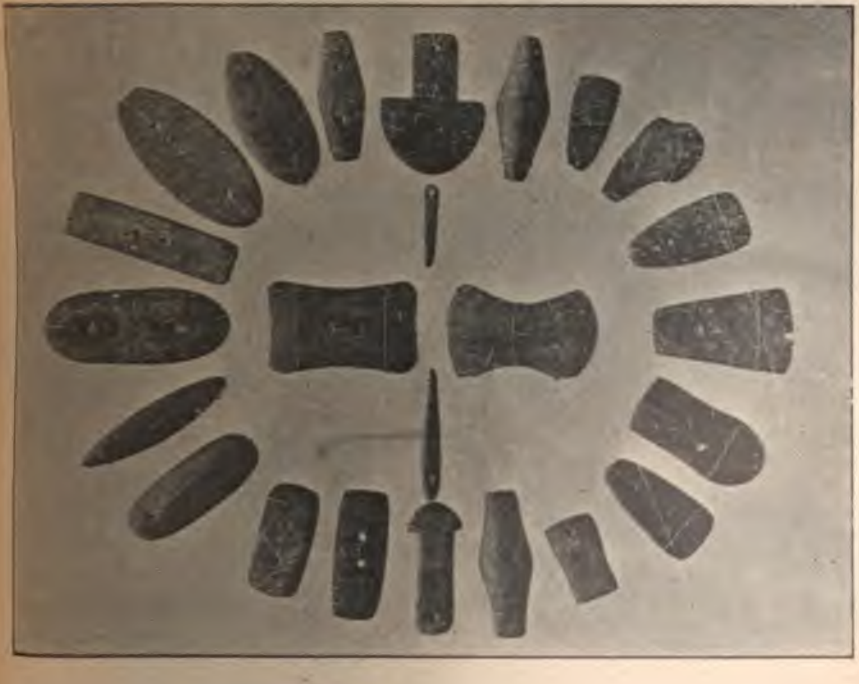

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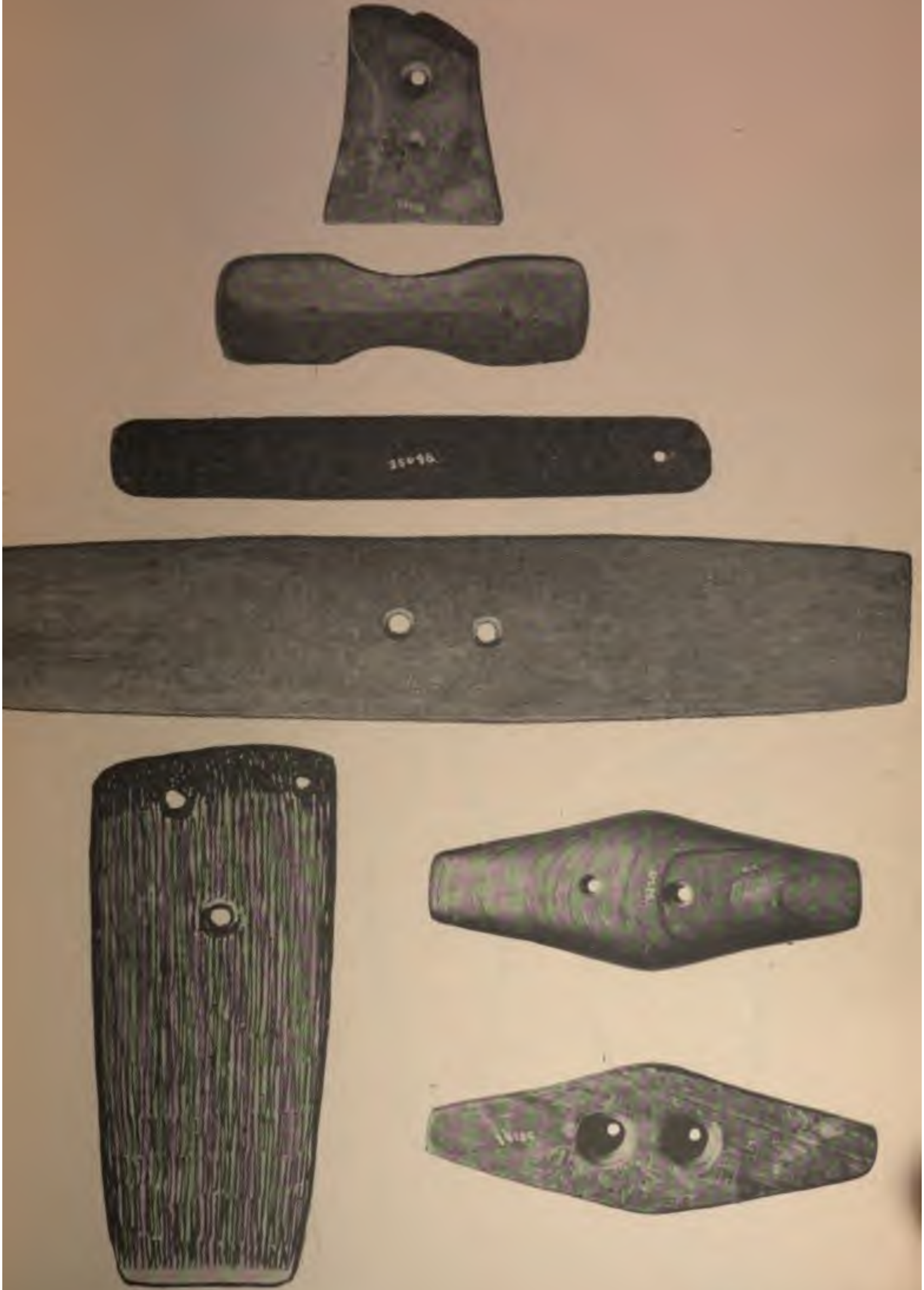

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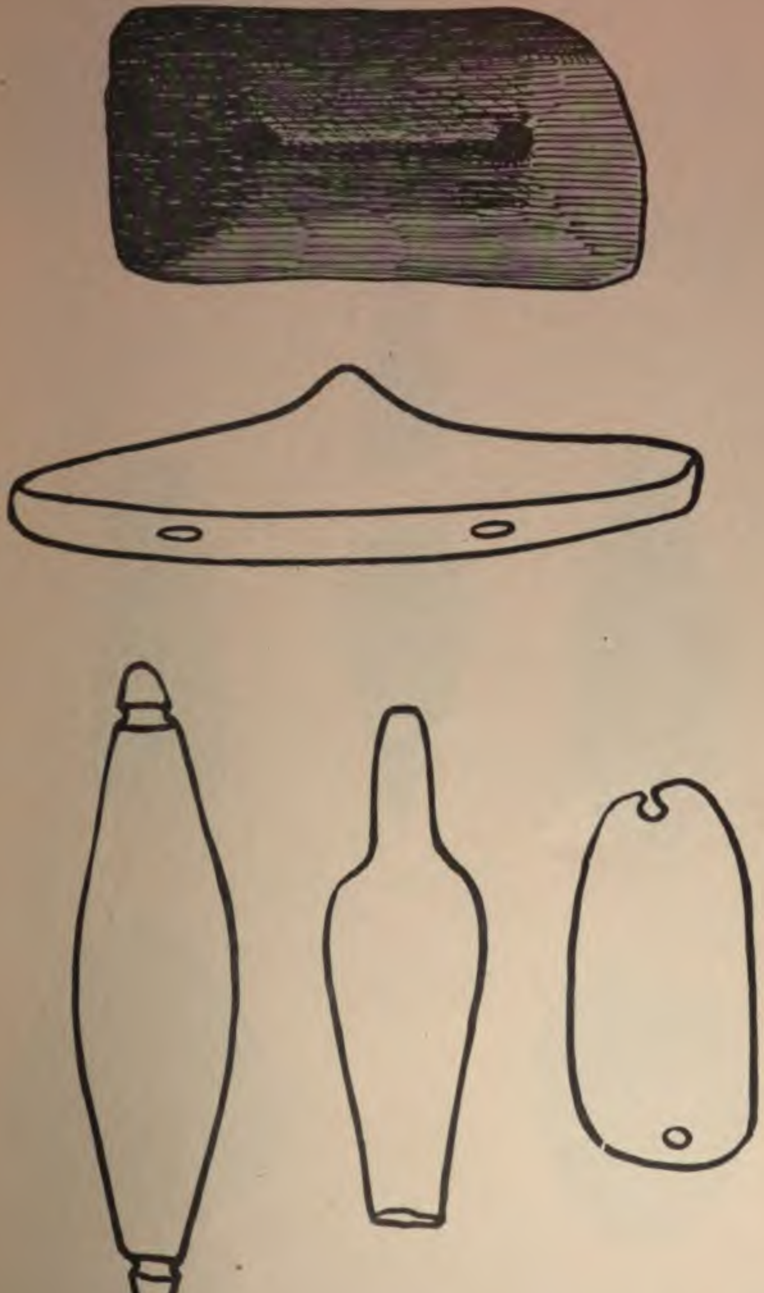

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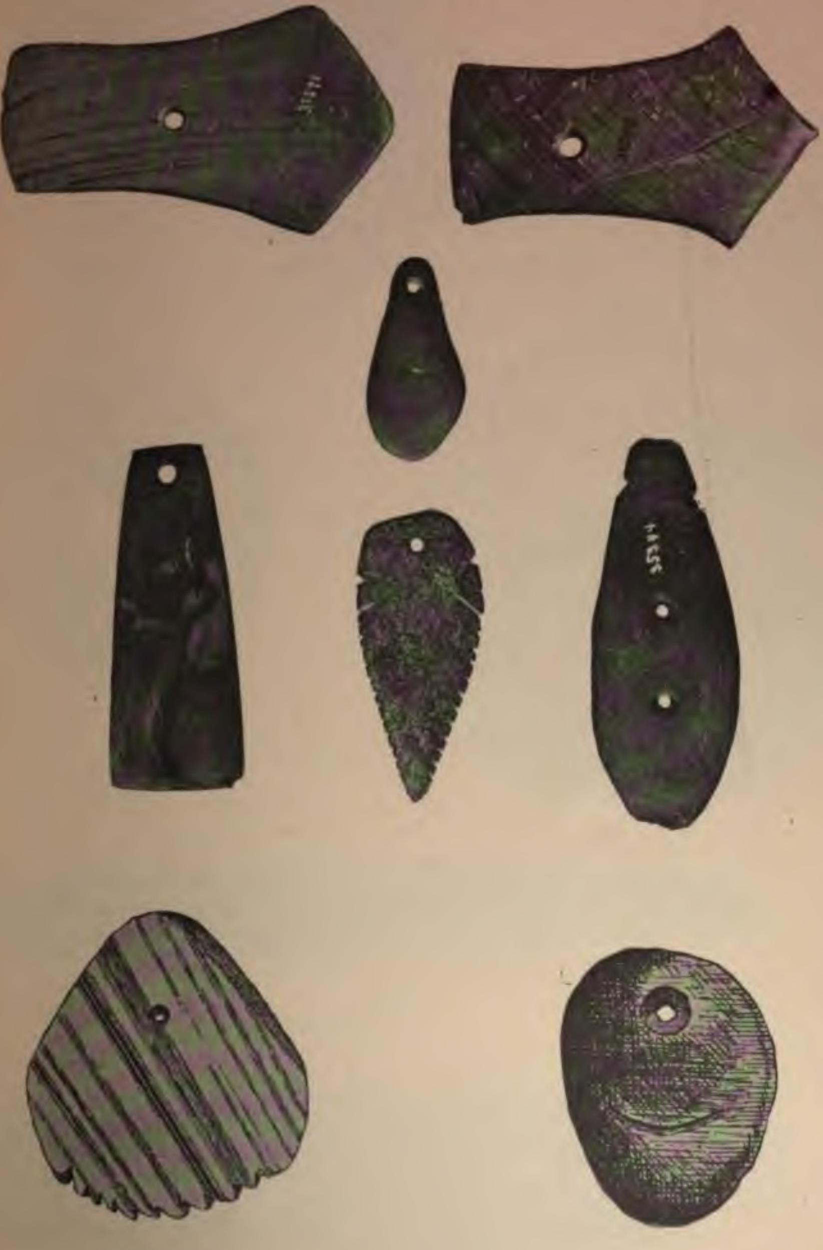

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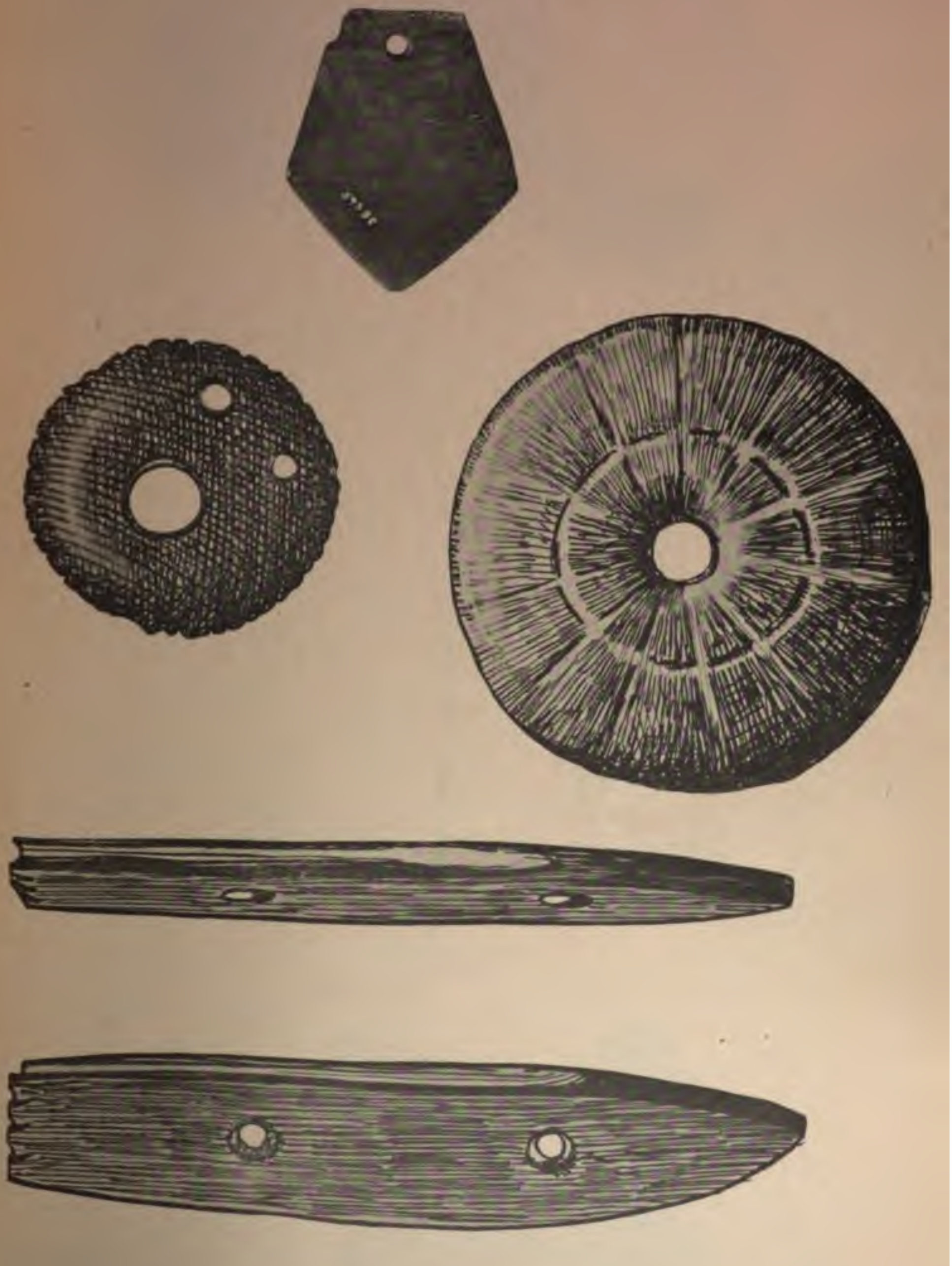

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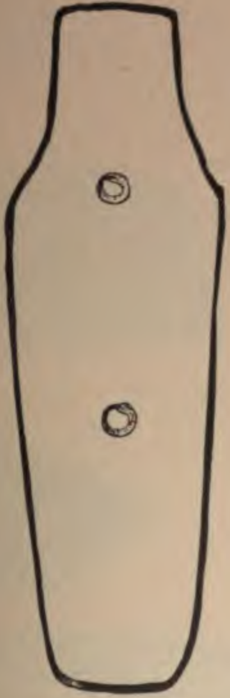

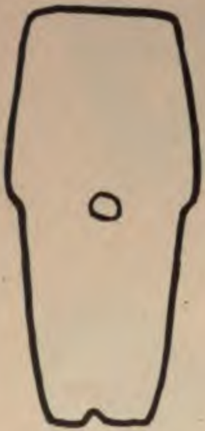

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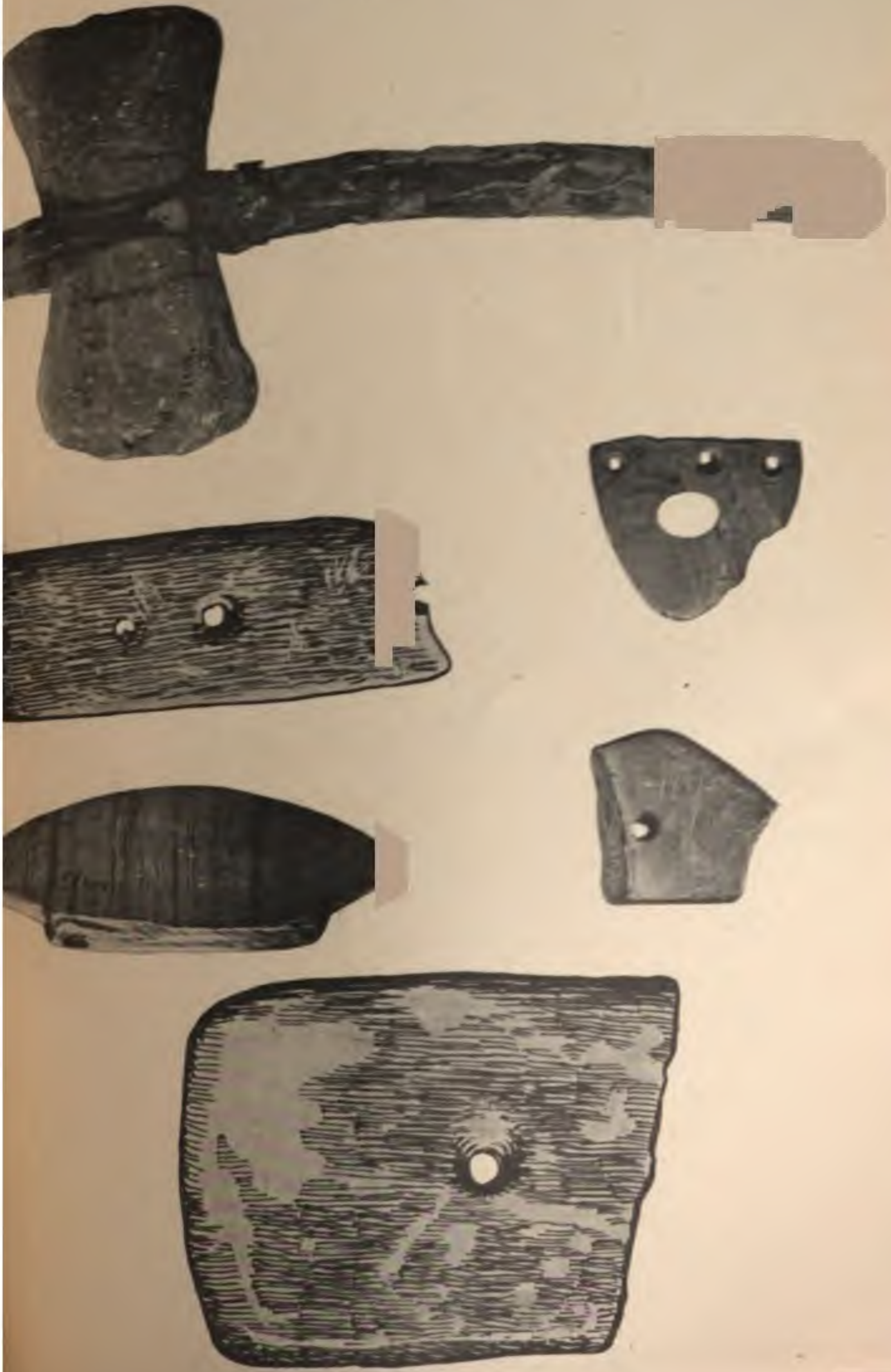

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PHILLIPS ACADEMY, ANDOVER, MASSACHUSETTS
DEPARTMENT OF ARCHAEOLOGY

BULLETIN III

A Narrative of Explorations in New Mexico, Arizona, Indiana, Etc.

TOGETHER WITH A BRIEF HISTORY OF THE DEPARTMENT

By WARREN K. MOOREHEAD, Curator

PRICE 75 CENTS (POSTPAID)

ANDOVER, MASS.
THE ANDOVER PRESS
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THE TRUSTEES OF PHILLIPS ACADEMY:

Gentlemen:

I herewith hand you my report upon the origin and development of this Department. During Mr. Peabody's lifetime the explorations and collections were made under his direction. Since 1902 the work has been done under and with the approval of the Honorary Director, Dr. Charles Peabody. I wish to thank the Honorable Trustees of Phillips Academy, Principal Alfred E. Stearns, and Dr. Peabody for cordial support rendered me.

WARREN K. MOOREHEAD.

NOVEMBER 10th, 1906.

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PREFACE.

BULLETIN No. III is not confined to descriptions of explorations. It was suggested by Mr. Alfred E. Stearns, Principal of the Academy, and Mr. James C. Sawyer, treasurer, that a BULLETIN suitable for distribution among the Alumni and friends of the school should be published. It must be remembered that Phillips Academy, Andover, is the only preparatory school in the world that possesses a fine museum and Department of Archaeology. The instruction given the students by the Department is not confined to archaeology, but embraces anthropology and kindred subjects: psychology, sociology, criminology, evolution, etc., all of which are treated as elementary courses.

While this report is not confined to the technicalities of explorations as explained above, yet it describes the work done for Mr. Peabody and also the explorations conducted by the Department since 1901 and as yet unpublished.

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49 Pictographs copied from the cliffs six miles south of Phoenix.

50 Pictographs copied from the cliffs six miles south of Phoenix.

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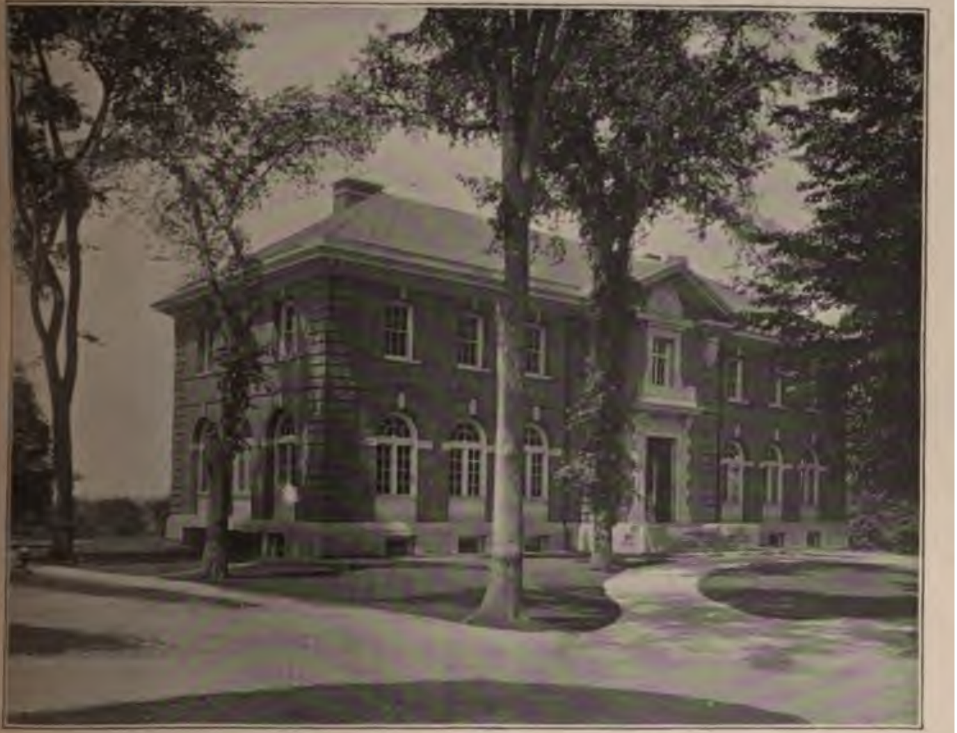

FIG. 1 — DEPARTMENT OF ARCHAEOLOGY BUILDING
PHILLIPS ACADEMY, ANDOVER, MASS.

From a photograph by Mr. Guy Lowell.

UNIV. OF MICH.

A BRIEF ACCOUNT OF THE DEPARMENT OF ARCHAEOLOGY AT PHILLIPS ACADEMY.

In November, 1895, a short article on "Mound Exploration" appeared in the *Philadelphia Press*. The article did not differ essentially in character from others upon this subject. However, it attracted the attention of Mr. Robert Singleton Peabody, a gentleman residing in Germantown, Philadelphia, and he wrote to the editor for information, and the editor forwarded the letter to the author. Thus began a correspondence and acquaintance which culminated in the founding of the Department of Archaeology at Phillips Academy.

During the year, 1896, the author of this BULLETIN purchased a number of collections for Mr. Peabody. In the spring of 1897 he went to Farmington, New Mexico, in order to regain health and made collections at the Chaco Group and in the San Juan Valley. In November the same year he left Ohio and established himself in Phoenix, Arizona, and gave his time thereafter in Mr. Peabody's interests. From November until the first of June, 1898, he employed a number of men and dug in the adobe ruins in the Salado valley and collected from the surface of various sites. On returning to Ohio he visited the large village sites along the Ohio river, between the mouths of the Great Miami and the Wabash, exploring at Aurora, Lawrenceburg, etc.

In the fall he went to the Adirondacks and resided there three winters, and during this time occasionally visited Mr. Peabody and was in constant communication with him Being unable to collect in person, he employed several competent collectors, notably Mr. Clifford Anderson, who excavated the cemetery at the mouth of the Wabash, collected at Flint Ridge, and in Tennessee, Arkansas, and elsewhere.

In March, 1901, Mr. Peabody and his wife, Margaret A. Peabody, founded the Department of Archaeology at Phillips. The foundation was sufficient for future maintenance, and to erect a beautiful building suitable for museum purposes, containing a large lecture hall, a library, and offices.

Mr. Peabody wished to improve the social condition of the students of the Academy. He dwelt upon his own boyhood at Phillips, laying particular stress upon the lack of a reading-room and meeting place for the boys, and upon the inadequate provision for the various societies and clubs. Mr. Guy Lowell, the distinguished architect of Boston, was asked to design a building that should contain adequate space for museum purposes, and at the same time combine the social features Mr. Peabody had in mind. The result is that after three years of occupation the building is entirely satisfactory. The two separate and distinct interests do not in any way conflict or inconvenience each other.

The building which is the home of the Department of Archaeology, while it was built but four years ago, seems a very part of the Academy. Surrounded by fine old elms, constructed of dark red bricks, with granite base and entrance motive, it is a building of great simplicity and dignity. It has all the charm of the old Colonial structures, with the added attractiveness of well designed modern work. It stands on the site of the original Phillips Academy.

The exterior has but little ornament, the interest being given by the triple arch motive on either side of the main entrance, which repeats on the ends, with the decoration being concentrated about the central feature. This portion is constructed of granite. Just beneath the pediment at the center, the Coat of Arms of the Academy is beautifully carved in Tennessee marble. At either side is a cartouche of the same material, the one on the left bearing the date 1778, the one on the right 1901.

The building is entered by broad granite steps flanked by large buttresses. The generous entrance hall, with its Doric columns, opens directly into the exhibition rooms, one on either side. These are well lighted and admirably arranged for the interesting and valuable collections they contain. There are eighteen large cases, but only a small proportion * of the specimens are shown: the rest † being stored in the lower part of the cases and in the attic.

The whole first floor gives one an impression of spaciousness,

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* 11,150 † 44,778

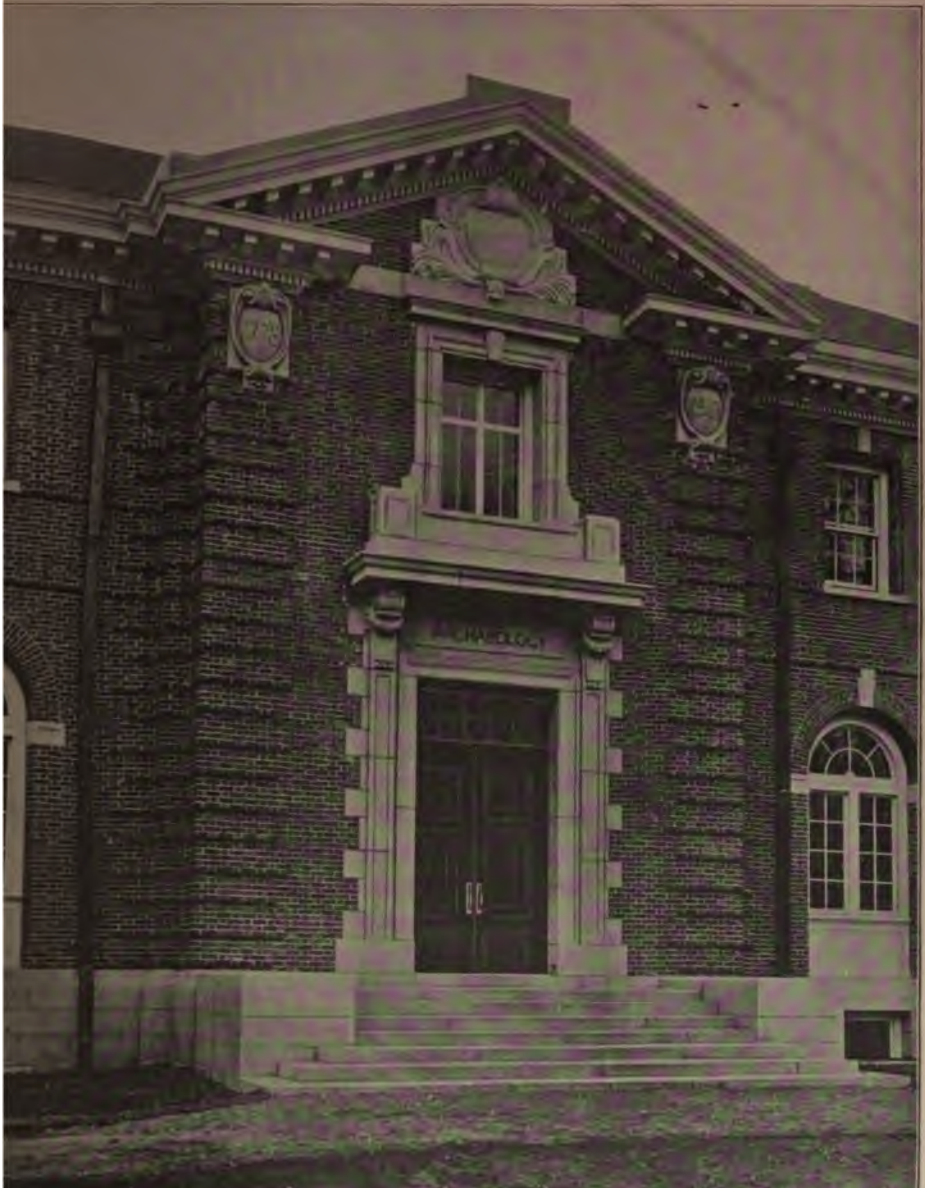

Fig. 3 — DETAIL OF THE FRONT OF THE ARCHAEOLOGY BUILDING

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quiet and charm, having the distinct character of a museum where one expects to find rare and unusual groups of objects. This floor also contains the Director's office, the Curator's office, and the cataloguing room.

In the exhibition room at the left is a handsome and massive fireplace, with mantel finished in Mexican onyx. The room to the right has a circular iron staircase extending to the story above. A broad staircase, set off by a graceful ornamental iron rail, leads to the second floor. Here again a generous hall opens, with the lecture hall on one side and the library on the other. The lecture hall has a small platform and is well adapted to day and evening use. It will accommodate 175 persons and belongs exclusively to the students after four o'clock, constituting a convenient meeting place for the various musical clubs, societies, etc.

The library serves to make the building whole and complete. It is not as large as might be desired, but it presents sufficient books for research along almost any line. Naturally, in a preparatory school, one would not expect as comprehensive a library as is found in colleges. It is finished in oak with a handsome fireplace. Including the room at the rear, the library has a capacity of 4000 volumes. It is furnished with all important magazines and with files of newspapers from the leading cities of the United States subscribed for by the students.

In the basement there is a fine dark room and developing room equipped with necessary chemicals for work in photography; various club rooms for athletics, school periodicals, chess, and golf clubs. All these rooms are furnished with desks and tables for use of the students.

The building is so designed that wings may be added if necessary. It is heated from the central plant and the whole structure is fire-proof. It cost $50,000.00 and the specimens are valued at $50,000.00 more.

Mr. Peabody's entire collection numbered some 38,000 specimens, and on the appointment of his son, Dr. Charles Peabody, as Director and the writer as Curator of the Department, the latter went to Germantown and expressed the collection to Andover. While the building was under construction, the exhibits were numbered, catalogued, and arranged in another building, and were moved into their present quarters in March, 1903. At the present writing, October 10th, 1906, there are 55,928 specimens* in the museum. Most of these specimens were collected by or under the direction of the writer, although many persons have contributed to make the Andover collection what it is since the foundation of the Department. Next to Mr. Peabody's gifts, the largest accessions have been received from Mr. Clarence B. Moore of Philadelphia. Mr. Moore has carried on explorations in Florida, Alabama, and Georgia for the past ten or twelve years, and has made extensive collections and published a number of reports descriptive of his work. Mr. Moore very kindly presented the Department some thirteen hundred specimens of pottery, beads, stone implements, clay effigies, etc., covering almost the entire range of art among the Florida tribes. These are mounted in a case seven meters long, two and one-third meters high, and one and three-fourths meters wide. The drawing of the case and contents is reproduced in fig. 61. Mr. Moore's donation enabled the Department to present for the benefit of students a comprehensive idea of prehistoric times in Florida. It is the best single exhibit in the entire museum.

While a list of donors † and the various objects they have kindly presented the Department is appended to this report (see p. 170), several persons should be especially mentioned in this place. Mr. J. L. B. Taylor of Pineville, Missouri, sent the Department some five hundred stone and bone objects from village sites and caverns of southwest Missouri. Mr. J. W. VanKirk of Pottsgrove, Pennsylvania, gave us a thousand specimens, being pestles, axes, celts, projectile points, ornaments, hoes, etc., from the village sites along the Susquehanna river, Pennsylvania. Mr. Gilham of Hopland, California, formerly of San Francisco, presented a collection of one hundred obsidian implements from California. Miss Mollie Hall of Hopkinsville, Kentucky, sent three hundred and fifty archaeological objects from Tennessee. Messrs. E. R. Steinbrueck and Rev. A. T. Gesner sent a collection

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* In round numbers. The last number in the catalogue is 41,763, but in many instances five to twenty specimens are entered under one number.

† Requests similar to the one presented on page 179 of this BULLETIN were sent to owners of archaeologic collections.

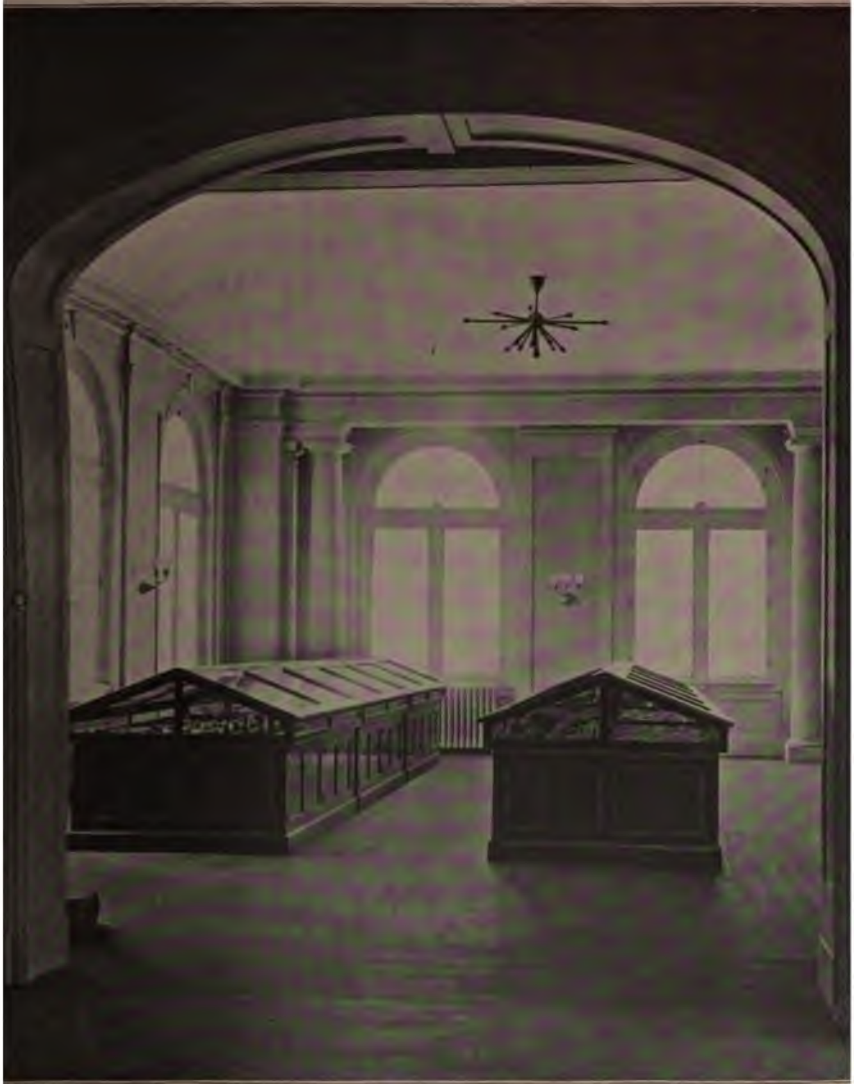

FIG. 2 — ONE OF THE EXHIBITION HALLS IN THE ARCHAEOLOGY BUILDING

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of a hundred and fifty implements from the Mandan sites, North Dakota. These are especially interesting at this time, as Harvard University made a detailed study of the Mandan sites in the summer of 1905. It was suggested as a result of the investigations that the Mandans may have come from the Ohio valley. The writer of this report advanced the same theory in 1889*, and based it on a different line of argument.

Other collections of consequence were received from Mr. H. K. Deisher of Kutztown, Pennsylvania, who gave us certain pestles, obsidian implements, crania, etc., from California: Dr. Charles Peabody, material from Bushey Cavern, Maryland; Albert L. Addis of Albion, Indiana, unfinished ornaments and ceremonials, and through Mr. Addis' donation some new information was secured, and this has been of value in the study of "The So-Called 'Gorgets'"†, and the process of manufacture of Mr. Addis' specimens will be set forth in more detail in a future BULLETIN devoted to the "ceremonial" or "problematical" class.

The Department wishes to also thank several persons to whom it is indebted for past favors: Miss Mollie Hall, for information regarding the prehistoric remains in the vicinity of Hopkinsville, Kentucky: Dr. W. N. Wallace of Farmington, New Mexico, who accompanied the expedition to the Chaco Group as interpreter and rendered valuable assistance; Mr. William Foster made several hundred drawings of the specimens in the Phillips Andover Museum, and some of his sketches are reproduced in this BULLETIN. Thanks are tendered Dr. George H. Pepper of the American Museum of Natural History, New York; and Dr. F. W. Hodge, editor of the "American Anthropologist", for the loan of six illustrations and for information.

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*Fort Ancient, p. 115.

† *Bulletin II, The So-Called "Gorgets"*, Department of Archaeology. Phillips Academy, Andover, Massachusetts. C. Peabody and W. K, Moorehead, 1906.

SKETCH OF MR. ROBERT SINGLETON PEABODY.

Mr. Robert Singleton Peabody was born in Muskingum County, Ohio, in 1837, and entered Phillips Academy April 20, 1854, at the age of sixteen years. He graduated the first man in the Class of 1857 with the Valedictory address at the close of an English oration on the subject "Roman Literature and Arts as affected by Foreign Conquest". His uncle was Mr. George Peabody, the noted philanthropist. Mr. George Peabody was interested in his nephew and attended the Commencement exercises of 1857. Recognizing the worth of Phillips Academy, he established, in 1866, a Chair of Natural Sciences and the Trustees appointed Professor William B. Graves as head of that Department. After Mr. R. S. Peabody had graduated from Harvard, in the Class of '62, he practiced law in Vermont and subsequently took up his residence in Germantown where he afterwards resided.

Among his classmates were Mr. Convers, the founder of the Mathematical prizes in the school, Professor Allen C. Barrows of the Ohio State University at Columbus, Dr. John H. Denison of Williamstown, James B. Hammond of Hammond Typewriter fame, the eminent physician James N. Hyde of Chicago, Ex-Congressman Joseph A. Scranton, and the patriot Frazar A. Stearns who fell at Newbern.

Mr. Peabody spent his boyhood in the valley of the Muskingum and as in that region there are numerous mound-builder and Indian remains, he became interested in archaeology. With his own hands he collected some one or two hundred specimens on his father's farm. When the collection at Phillips was numbered the records properly began with Mr. Peabody's personal finds and No. 1 is an interesting hematite celt.

In 1889 and 1900 Mr. Peabody consulted with Dr. Cecil F. P. Bancroft, Principal of Phillips Academy, and Dr. Thomas Wilson, Curator of Anthropology at the Smithsonian Institution, and the three projected the scheme for the Department. Mr. Peabody died October 1st, 1904. The last four or five years of Mr. Peabody's life he was an invalid and suffered more than falls to the lot of the average man. Yet he bore it all very patiently, although frequently suffering intense pain. He had a kind word for every one and men who came in personal contact with him were charmed by his delightful manner. He was a fine Latin scholar and because of his legal knowledge he was frequently sought by men of great affairs. In an unostentatious way he did a great deal of good, and the sum and substance of his liberalities will never be known. Modesty was his characteristic trait and he was prompted to keep the splendid donation to Phillips out of the newspapers. Indeed, so far as it was possible, he desired that no one refer to himself and Mrs. Peabody as the founders of the Department.

He was a nature student and for more than twenty-five years spent his summers in the Adirondacks, where he had a cabin at Saranac Inn. Aside from his desire to teach the young something regarding the primitive conditions in America, he wished that the boys in Phillips might have better facilities than those he enjoyed fifty years ago when on the Hill. The present building accomplishes this end, and will always stand as a monument to him

During the years 1896 and 1898 Mr. Peabody took active interest in the collecting of specimens and although frequently confined to his room, he had the boxes as they came opened, and inspected their contents. He was particularly interested in the "gorgets", "ceremonials", and other "problematical" forms and it was his wish that the Director and the Curator devote their spare time during several years to the study of these unknown artifacts.

Mr. Peabody had no desire to found a great museum. He rather had it in mind to establish a "working department" and so expressed himself on numerous occasions. He held that the greater museums emphasized the necessity for explorations of sites, and investigation of living tribes almost to the exclusion of the serious study of material on hand. He thought that there were now sufficient specimens in the museums and private collections of the United States to furnish data for reasonable conclusions.

In the summer of 1890 the Curator was invited to spend some weeks with Mr. Peabody at his cabin (Saranac Inn on Upper Saranac Lake, Adirondacks). During several long conferences

Mr. Peabody outlined with particular detail just what he desired to accomplish when he should establish the Andover Department.

Although Mr. Peabody made no pretensions to archaeological knowledge, yet he was quite well versed in scientific matters. He explained at length why he had instructed the writer to make extensive collections of surface material in Ohio and Kentucky in the previous year and during the winter of 1896–'97. His Department, he said, might or might not carry on explorations in the future. If not, there were always available the results of extensive explorations on the part of other museums. He wished the writer to procure all the local collections possible. That is, of collections well recorded and gathered in a specific area — collections that should illustrate the art of the region. These being surface collections from the village sites and fields, might be found to present differences more or less marked when contrasted with similar specimens from mounds and graves. He believed that the Ohio valley was inhabited for a great length of time. The presence of Flint Ridge material in one locality, of Tennessee nodular flint in another and local chert in a third, might indicate separate tribes or a considerable length of occupation. Furthermore, that the gravel burials might be found to represent a different culture from that of the mounds. He took no stock in the old theory of "general mound builder culture" so far as it related to "high culture", as expressed by some writers. But he did believe that the modern tendency was to swing too far to the other extreme and classify all prehistoric peoples in the Ohio valley as on a plane with the Indian tribes found in the region by the earliest explorers. He requested that the writer make a careful study of the workmanship of flint implements, ceremonial objects, etc., after the Andover collection should become extensive. He hoped that such a study would prove that the art of certain localities could be recognized and that an arrow-head of uniform shape and workmanship did not necessarily imply the same culture or the same time horizons; that in the various localities one would find certain forms of knives, ceremonials, or some other implement characteristic of that tribe or that locality. In such observations, he contended, lay the value of archaeology. The things must be studied as the botanist studies his leaves and the sweeping generalization made that flint implements were all more or less alike had no foundation in fact, according to his observations.

The Curator remembers one occasion especially during which the Founder emphasized his views in the course of a conversation lasting most of the night. Mr. Peabody had read, or examined, many of the museum reports and works upon archaeology. These were chiefly a record of facts, he stated. Hundreds of pages were devoted to a recitation of what was found in various mounds, graves, and sites. Thousands of pages chronicled observations upon living tribes. The stone objects, and particularly those denoting the height of stone-age art, in great numbers were now on exhibition in the various museums. It was high time, he said, that some one should devote his life to their study. Such study would lead to a geographical distribution of types and possibly the definite boundaries of certain prehistoric art areas might be determined. He thought that the Department at Andover would be able to avail itself for study of the great accumulations in museums. Mr. Peabody desired that the Department trace the development of forms from the rough to the completed object, and make collections with that end in mind.

The wisdom of his suggestions has been fully appreciated by the Trustees of the Academy and the officers of the Department.

INSTRUCTION IN ARCHAEOLOGICAL STUDIES.

Since the Department was founded some 114 students have taken the course in American Archaeology. Naturally, the course offered is not as technical or comprehensive as similar courses in Yale, University of Chicago, Harvard, or Columbia. But it is sufficiently complete to give young men a pretty fair knowledge regarding stone age man here and abroad. The lectures are frequently illustrated by lantern slides, of which the Department possesses about five hundred. Addresses or formal lectures to the students by archaeologists and ethnologists from the larger museums have been given. Among those who spoke were Professor Putnam, Dr. Farrabee, Professor Morse, Professors Smith and Robinson.

Correspondents in various parts of the United States and Canada have asked for archaeologic information, and more than 3500 letters, containing desired data or advice, have been written by the Curator during the past five years.

Several academy students have procured collections for the Department.

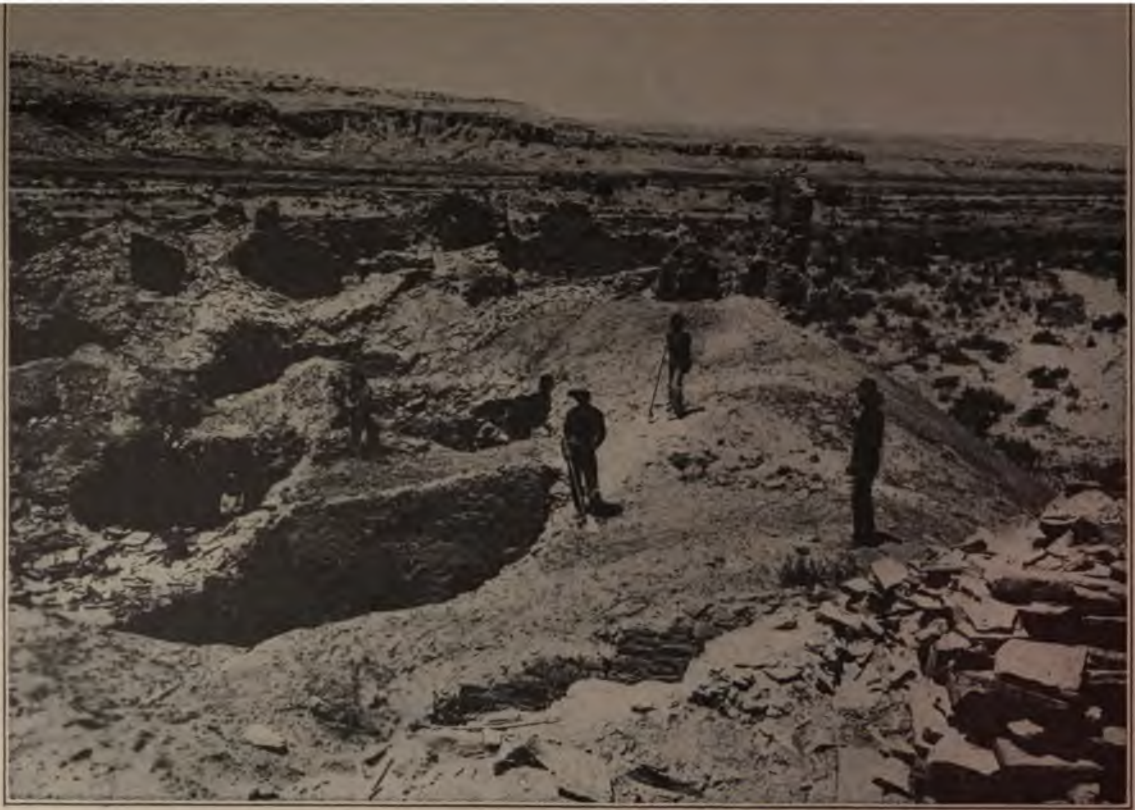

FIG. 4 — WESTERN END OF PUEBLO BONITO

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EXPLORATIONS IN NEW MEXICO.

In April, 1897, the writer left Farmington, New Mexico, with nine men, a large wagon, and five horses, bound for the Chaco Group ruins, seventy miles south. This had been partly investigated by Dr. George H. Pepper in the interest of the American Museum of Natural History, New York, and since the date mentioned Dr. Pepper has conducted more extensive explorations.*

It was not the purpose of Mr. Peabody's expedition to attempt a thorough exploration, but simply to make a typical collection in three weeks, and, as a total of about two thousand specimens of various kinds were secured in that time, the object of the visitation was accomplished. For fuller descriptions of the Chaco Group readers are referred to the various articles cited.

For several days the men made careful search of the surface about each ruin and collected a number of large metates, mano stones, arrow points, fragments of pottery, etc. As there was practically no grass in the Chaco region, the teamster was sent back to Farmington for more baled hay, oats, etc , as well as provisions for the men and empty boxes in which to pack the finds. He took with him five or six hundred pounds of boxed specimens, and in the course of a week returned.

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* *Ceremonial Deposits Found in an Ancient Pueblo Estufa in Northern New Mexico, U. S. A.* (In the Monumental Records for July, 1899.)

Ceremonial Objects and Ornaments from Pueblo Bonito, New Mexico. (Anthropologist, April-June, 1905.)

The writer is indebted to Dr. Pepper for the following references to the Chaco Bibliography:—

Gregg, Josiah. "*Commerce of the Prairies*", I, 284–285, 1844.

Simpson, J. H. "*Journal of the Military Reconnaissance from Sante Fe, New Mexico, to the Navajo Country.*" Washington, 1850.

Jackson. Wm. H. "*Ruins of the Chaco Canon, Examined in 1877*"; Tenth Rep. Hayden Survey, Pt. III, Washington, 1878.

A number of magazine articles.

Chas. Lummis has written a short article concerning this group. There are scattering descriptions of it in the Government Reports.

Holsinger's manuscript report in the General Land Office in Washington covers the ground in good shape. The title of his article is "*Report on the Prehistoric Ruins of Chaco Canyon, New Mexico.*"

Mentions of some of the articles pertaining to this group found in Hewett's bibliography, in his article entitled "*Historic and Prehistoric Ruins of the Southwest.*"

After the expedition had collected such things as could be found on the surface, a small cemetery about a mile from the principal ruin was explored. At a depth of one half to one meter were found a number of skeletons and forty or fifty jars, bowls, etc. Some of these are illustrated in figs. 10, 11, 12, 13 and 15.

The rooms of the first story of Pueblo Bonito, the largest building of the Chaco Group, are quite dark. This is true of all the large pueblos in the San Juan Country, and is due to the falling of walls, the shifting of sands by the winds, and other agencies, thus destroying the upper stories and burying the doorways and air shafts of the lower rooms. The entire party spent two or three days in these underground rooms, climbing from one into another and collecting pottery and other objects. Under the floor of the small room near the northwest corner of Pueblo Bonito was found a splendidly preserved skeleton of a young woman wrapped in a large feather robe, which was originally 1.3 by 2 meters. Some of the pottery accompanying this burial is shown in fig. 13. Unfortunately, of the feather robe nothing remains but the cords on which the feathers were strung. Sandals of both the cloth and fibre kind were collected, as well as some wooden objects and a "throwing stick". In a letter to Mr. Peabody the following paragraphs occur: —

"Just opposite our camp is the largest ruin — Pueblo Bonito. The upper stories have fallen down (it was originally three or four stories in height) and only the ground and second tier of rooms remain. In these rooms I found the fire-places, traces of corn and other foods, wooden implements, mortars, etc. We opened one or two rooms and observed several Kivas, built of stone, five to eight meters in diameter and perhaps four meters deep. In one that had been cleaned out by Dr. Pepper, there was a small walled, circular depression in the centre in which the sacred fire was placed. Around the base of this Kiva were seats on which performers in the ceremonies rested. Climbing down into the dark, underground rooms, over broken rafters, or through passageways, groping by aid of torches and candles, we

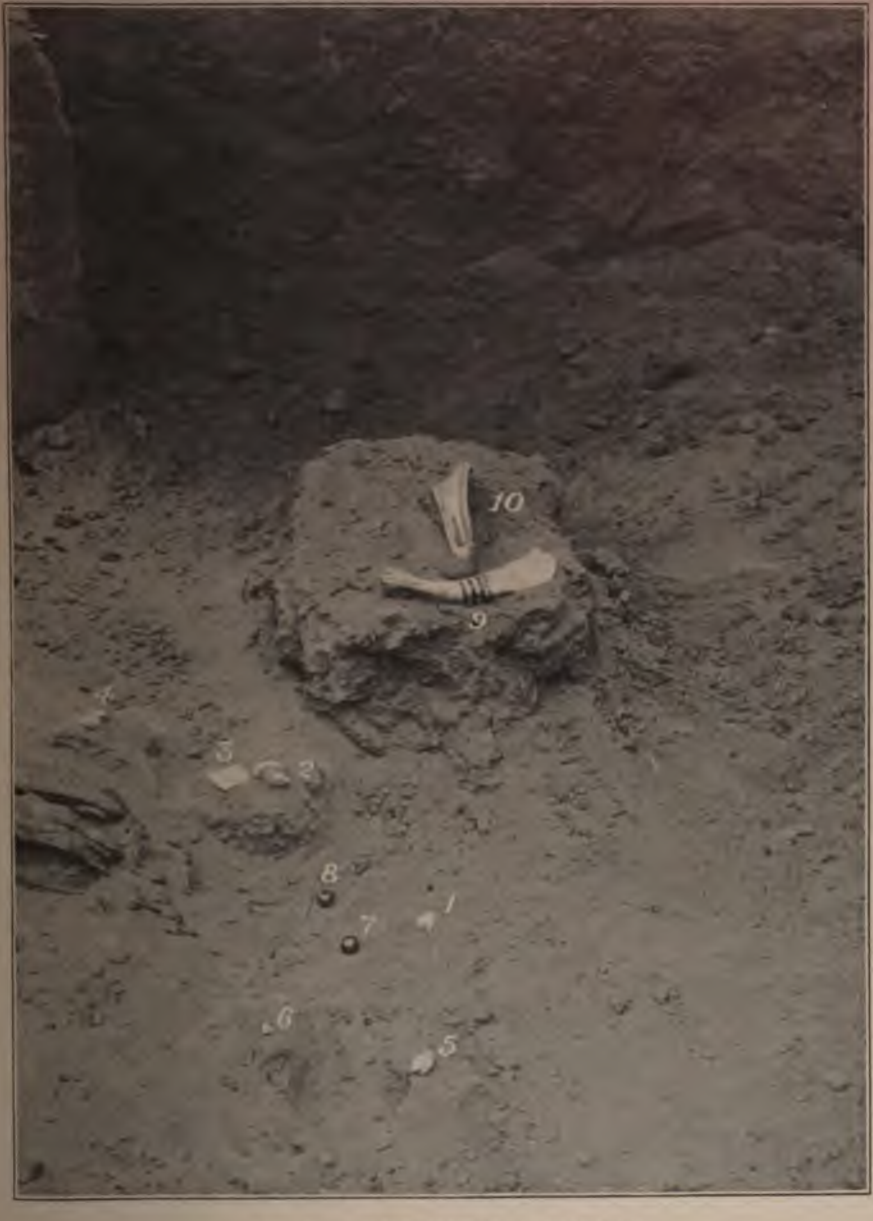

FIG. 5—CEREMONIAL OBJECTS
From a room in Pueblo Bonito

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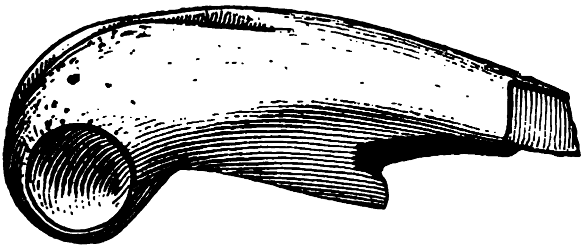

FIG. 6 — BONE SCRAPER

On which Turquoise was to be inlaid

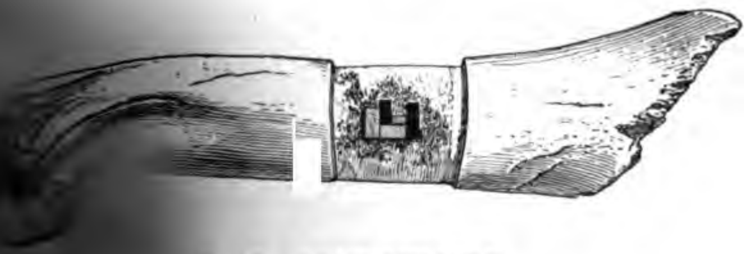

FIG. 7 — BONE SCRAPER

With inlaid work in Jet and Turquoise

found the rooms in which the ancients lived,—rooms in which burials were made.

"There is something fascinating in this 'catacomb' underground work—different from our Ohio explorations—more like that of Egypt. You can better understand the extent of Pueblo Bonito when I tell you that the walls are yet standing in two places eight meters high and fairly well preserved.

"Selecting at random a small room filled with rubbish, the workmen dug it out to a depth of three meters, down to a hard adobe floor. Near the bottom of this room were found three peculiar objects. (See fig. 16.) One is evidently a sandal last; the long stone, a knife or weapon; and the third must remain a mystery. Some one suggested that it formed the base for a post or support. This may or may not be correct. One would suppose that an ordinary flat, smooth stone would serve to hold an ordinary post in place and that a carefully cut square surrounded by a mat or depression would be unnecessary. It is usual to assign to 'problematical stones' a ceremonial significance, and possibly the 'cut square depression' may have served such a purpose."

The sandal last in fig. 16 is typical of similar specimens found in the Cliff Dweller country, according to Dr. J. F. Snyder, who has made a study of sandal lasts. The first published mention of them is found in Baron de Nordenskiold's volume, "The Cliff Dwellers of the Mesa Verde", Stockholm, 1893, p. 99. Dr. Snyder wrote an article for the "Antiquarian" (May, 1897), and, when additional information had been collected, a more exhaustive paper for the "American Archaeologist", (Jan., 1899). Dr. Snyder contended that these sandal lasts were used as bases on which to weave either sandals or small mats. He proves his contention by a study of the specimen shown in fig. 17. This last was of baked clay, and came from a cliff house in Butler Cañon, Utah. A careful examination of the surface revealed a stamped pattern of the sandal fibre which Dr. Snyder has reproduced in fig. 17. He says the rights and lefts were made by the simple expedient of turning the sandal last over. Regarding the interesting discovery, he says that it unlocked the puzzle so far as to demonstrate that the impression was made on smooth clay, "but the motive for

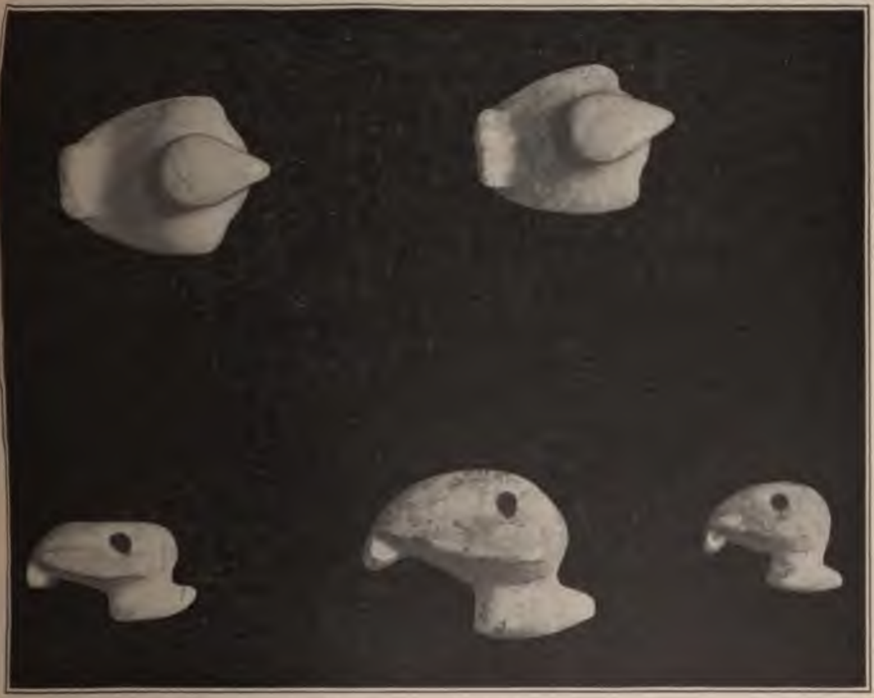

FIG. 8 — TURQUOISE BIRDS

From room 38 in Pueblo Bonito

preserving this stamped copy of the weaver's pattern on the terra cotta model remains yet to be explained, without we accept the conclusion that the object was made for no other purpose than simply to preserve the figure as a guide for weaving others to correspond with it." The clay sandal last is 30 cm. in length and 15 1-2 cm. wide. Regarding fig. 18, which the writer has reproduced from Dr. Snyder's article, Dr. Snyder says: —

"Sandals of various kinds have been found in the cliff dwellings differing in texture, form, and material. A common variety were made of untanned buffalo or elk hide, with the hair intact on the upper surface on which the foot rested. The yucca plant furnished the staple for nearly all the others. Some were coarsely made of twisted shreds of the leaf, and many, of neater structure, were wrought of the split fibres of more or less fineness. The prevailing shape of all, with the exception of those first described, was simply an ovoid, sometimes slightly modified, corresponding with the outlines of the foot only in length and breadth. The peculiarly curved front end with its square offset, of the more finely woven specimens, requiring a stone pattern for their fabrication, may perhaps be interpreted as a development of the esthetic in the progressive culture of those ancient tenants of the cliffs and caves."

In one of the underground rooms was found a double vase or jar of most singular pattern. These two jars were modeled on a wide strip of clay, thus holding them firmly on the same base. They were about 3 1-2 cm. apart at the bottom and top. Nine or 10 cm. from the base on which they rested is another strip of clay joining them again. The top of one jar is slightly broken; the other is broken half way between the base and the mouth. There are two perforations in the slightly broken jar near the top, for repair or for insertion of cords in order to suspend the vessel. The jars are painted with characteristic zigzag lines (lightning?), common on the Chaco pottery. Their height is about 27 cm.; length of base 23 cm.; diameter of top of one jar 11.5 cm.

The Chaco group of ruins, comprising some fifteen buildings, scattered over an area of three or four miles, furnishes oppor tunity for unlimited exploration. The sites should be preserved by the national government.

There is every evidence of a numerous population for generations. Roughly comparing the buildings with those of modern or inhabited pueblos, the writer estimates that at least 10,000 people lived in the Chaco Group at one time. There is no group of ruins in the United States to compare with these. For miles along Chaco Cañon and upon the bluffs as well, the surface is thickly strewn with pottery fragments and other evidences of human occupation. Well worn trails ascend the bluffs at numerous points, and opposite Pueblo Bonito the trail is worn deep into the rock. The culture is clearly pre-Columbian.

Dr. Pepper published in the "Anthropologist" for April–June, 1905, a paper entitled "Ceremonial Objects and Ornaments from Pueblo Bonito, New Mexico". Dr. Pepper kindly permitted the Department to republish his description of certain interesting objects found by him, and loaned for use in this BULLETIN, figs. 4, 5, 6, 7, 8, and 9. The museum at Andover has none of the turquoise birds or inlaid scrapers in its collections, but quite a number of turquoise beads or small pendants were found at the Chaco group and in the Salado valley, and are in the Department's exhibits.

It will be observed that portions of Dr. Pepper's text are omitted. Some of the sentences are not taken literally from his report, although the substance is practically the same.

Fig. 4 shows the western end of Pueblo Bonito. "The room" (in the foreground) was found, on examination, to be "filled with debris consisting of sandstone slabs from the fallen walls, decaying ceiling beams, and the adobe floors of upper rooms with whatever objects were on them when they gradually weakened and finally collapsed. On this account many objects of scientific interest were broken or scattered through the debris." Work in this room "brought to light an interesting collection of material, the greater part of which was of ceremonial character, or at least might have been used in sacred observances"

In the western part of the room an object of bone was found, "and investigation showed that it was inlaid with turquoise and

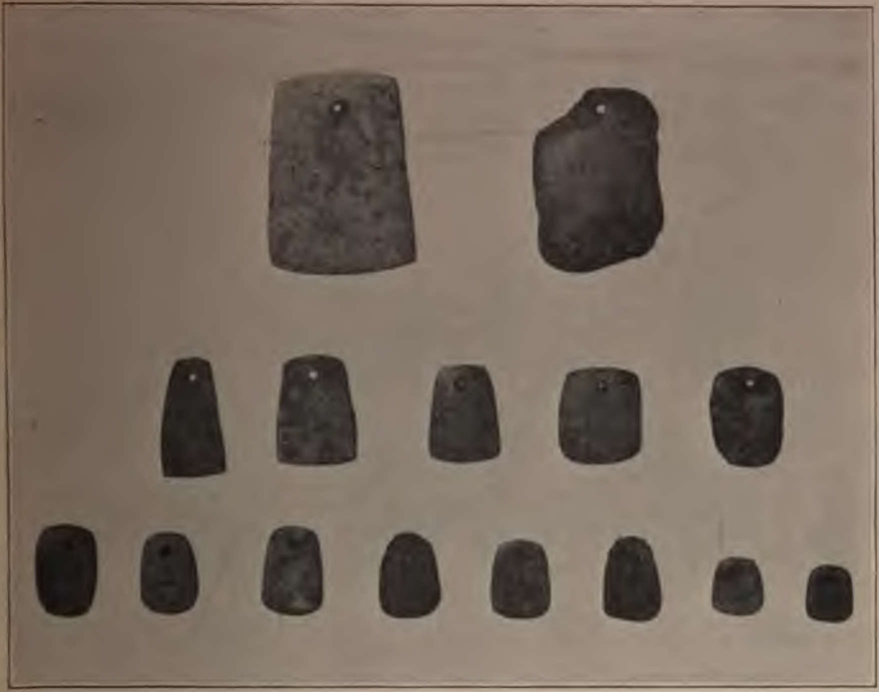

FIG. 9 — TURQUOISE PENDANTS

From room 38 in Pueblo Bonito

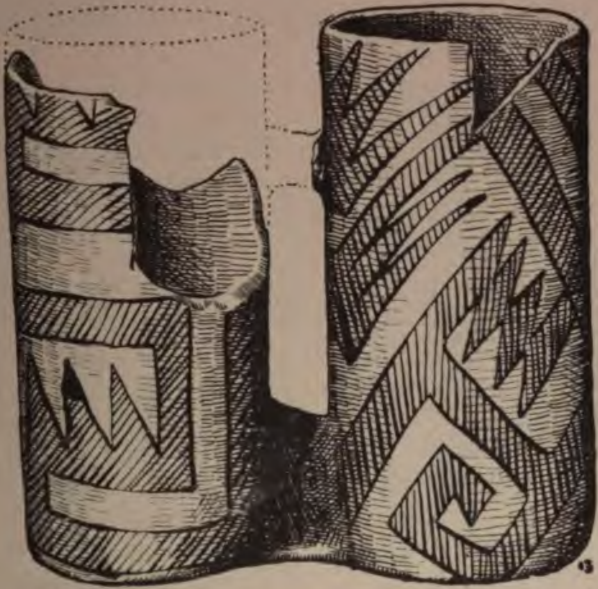

FIG. 10 — DOUBLE JAR FROM THE CHACO

S. 1-4

jet. The extremities of the bone had been shattered, but the mosaic had not been injured in the excavation." This specimen "proved to be of the so-called scraper form. Directly south and almost touching this scraper was another of similar shape and size."

These and other objects are shown in fig. 5. The following specimens were found near by: two turquoise pendants and a large slab of jet, not shown in the photograph; No. 1, a bird form of decomposed turquoise; No. 2, also a bird form; No. 3, a turquoise pendant; No. 4, a third bird form; No. 5, another turquoise bird; No. 6, tail portion only of a bird of turquoise; Nos. 7 and 8, beads of jet.

"Bone implements of the type represented in the accompanying photograph (fig. 5) are found throughout the ancient Pueblo region of the Southwest. * * * The bone scrapers from Pueblo Bonito were rarely decorated: but when ornamentation occurred, it was generally in the form of incised designs, such as cross-hatching, meanders, and animal forms."

One specimen, fig. 6, "was found in a fragmentary condition, but there are evidences that it had been prepared for the reception of an inlay. * * * In preparing the bone for the reception of the inlay, the usual method was no doubt employed. A groove was cut with a stone knife in one side of the humerus, and the cut extended until it encircled the bone. This process was continued until the bone could be broken apart. The cutting away of the under side was the next step. This was accomplished by grinding, and the final touches to the edges were given with a polishing stone. In scrapers designed for everyday use, no further work was done.

"Scraper No. 10 (in fig. 5) when found, five of the tesserae, three of turquoise and two of jet, were in place. From their position and general arrangement it would seem that the design had been in the form of a half-meander or an interlocking fret. Beneath the scraper were found nine jet and twenty-seven turquoise tesserae.

"This scraper is 15 cm. 5 mm. long, and is in perfect condition. The groove that held the mosaic is 2 cm. 6 mm. wide, and averages 2 mm. in depth. The loss of the design is compensated by the fact that we have been enabled to observe the

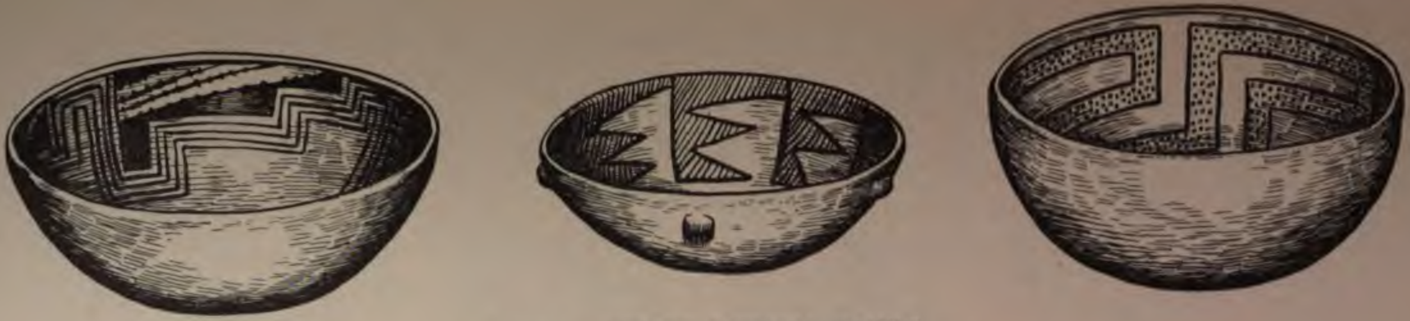

FIG. 11 — THREE TYPICAL BOWLS

From the Chaco Group of Ruins, Northern New Mexico S. about 1–3

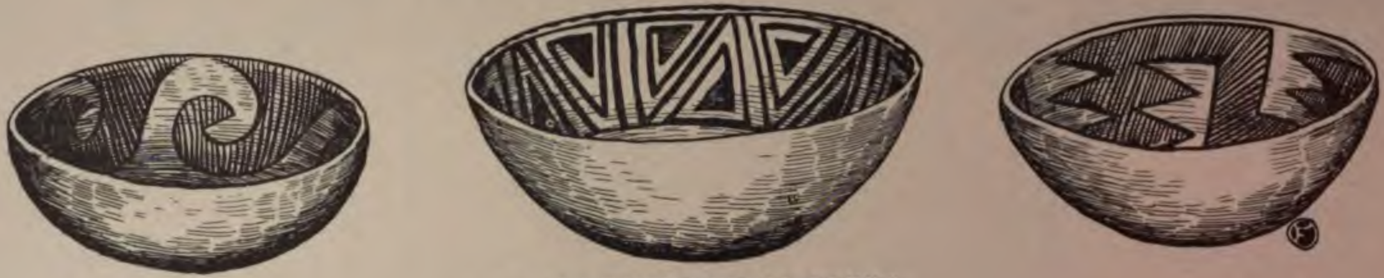

FIG. 12 — THREE CHACO BOWLS

S. about 1–3

finish of the bottom of the cut which was left rough in order that the piñon gum might the more firmly adhere.

"Of the five bird forms found in Room 38, four were perfect, and the fifth was represented by several fragments, the largest being the tail end, fig. 8. These birds are cut from decomposed turquoise, and in color are pale bluish green. There is practically no variation in the eight specimens of the type found in Pueblo Bonito. The material from which the birds are carved is so soft that it can be cut with a knife. The figures were probably roughed out with one of the many forms of stone implements, and then ground to the desired shape with sandstone grinders. On the surface of some of the birds may be seen fine lines, which, under a glass of low power, have the appearance of file scratches; they are nevertheless the marking made by the sandstone polishers. Lines of this character are in evidence on many of the stone implements found in this region, and are especially noticeable on objects of wood.

"Over the surface of each of these five turquoise specimens there is a dull red patina. There are evidences of the matrix in some pieces, but the surface color seems to be due to soil discoloration. In the other three bird forms found in this ruin by the Navaho workmen, there are indications of this discoloration, but the greater part of it had been removed by carrying the objects about in their medicine bags, or in using them as pendants on their necklaces. The head, tail, and wings of the birds are indicated in each instance. The variety represented is doubtless a water fowl, probably the duck, the poise of the head and the general angle of the body suggesting the appearance of a duck when resting on water. This form of bird seems to have been a favorite one with the sedentary people of the Southwest. From Pueblo Bonito alone it is carved from red hematite and stone, and in some Chaco ruins it has been found carved from pure turquoise, shell, and jet. In southeastern Utah, in the Grand Gulch region, some of the large basketry meal trays have a line of these bird figures as a decorative element; and in one of them the design is associated with the butterfly.* The largest bird (No. 2) is 2 cm. 7 mm. long, and 2 cm. 1 mm.

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*Geo. H. Pepper, *The Ancient Basket Makers of Southeastern Utah*, pp. 13, 15.

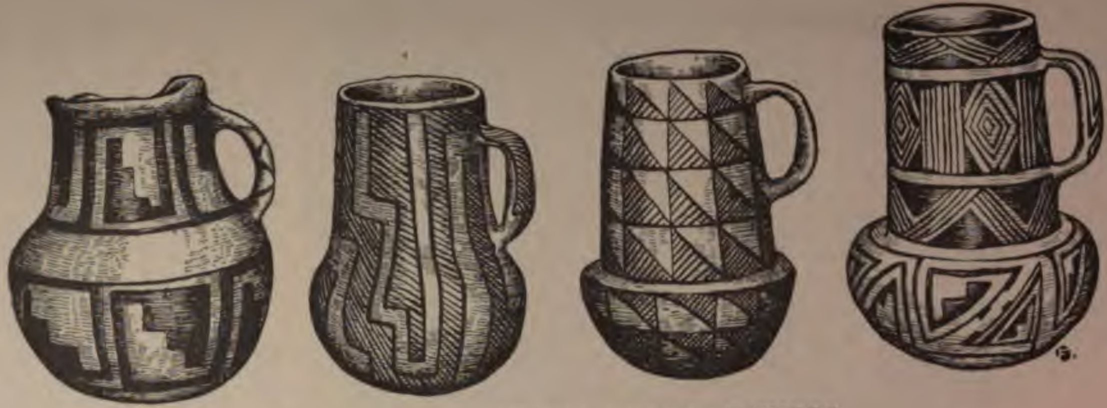

FIG. 13 — FOUR TYPICAL CHACO PITCHERS

S. about 1–4

wide. The smallest (No. 1) is 1 cm. 7 mm. long, and 1 cm. 3 mm. wide. These measurements do not include the projecting beaks, which vary in size in the different pieces, all of them being proportionate to the size of the body. The tails and wings are carved in relief, and all the specimens have lateral perforations below the front or shoulder portion of the wings. The position of the holes causes a top-heaviness when the birds hang free, but against the body they maintain the proper angle, hanging with the head upward.

"There were fifteen turquoise pendants associated with the larger objects herein described (fig. 9). Two of these are quite large, but the others are of medium size. The largest, No. 3, may be seen near the turquoise bird No. 2 (fig. 5), on a slight elevation northeast of the scrapers. It is 3 cm. 4 mm. long, with a width of 2 cm. at the top, and 2 cm. 5 mm. at the bottom, tapering gradually to the rounded base In color it is delicate blue. The polished surface shows an interlacing of matrix lines, and the back, with the exception of a very small space in the upper right-hand corner, is a layer of brown trachyte — the rock in which the turquoise is found. The pendant has a thickness of 5 mm.; the edges have been smoothed and polished, and there is a perforation in the upper part. The drilling in this specimen, which is at an angle, with the larger opening on the turquoise side, is the most irregular that has been found in the turquoise work from Pueblo Bonito. The most remarkable feature of the specimen is its color, which is very light as compared with the other specimens from this room, whose prevailing shades range from dark blue to dull olive green. The light blue seen in the turquoise of commerce is seldom found.

"Of the remaining fourteen pendants the largest is 3 cm. 1 mm long, and the smallest 9 mm. They vary in shape and thickness, but are typical of the forms found in the various rooms of Pueblo Bonito, as indeed throughout this entire culture area. Other objects of turquoise were 106 flat circular beads and one small tessera. The beads ranged from 3 mm. to 6 mm. in diameter, and averaged 1.5 mm. in thickness."

As our stay was brief, we made no remarkable discoveries. But Pepper's expedition was able to carry on continuous work

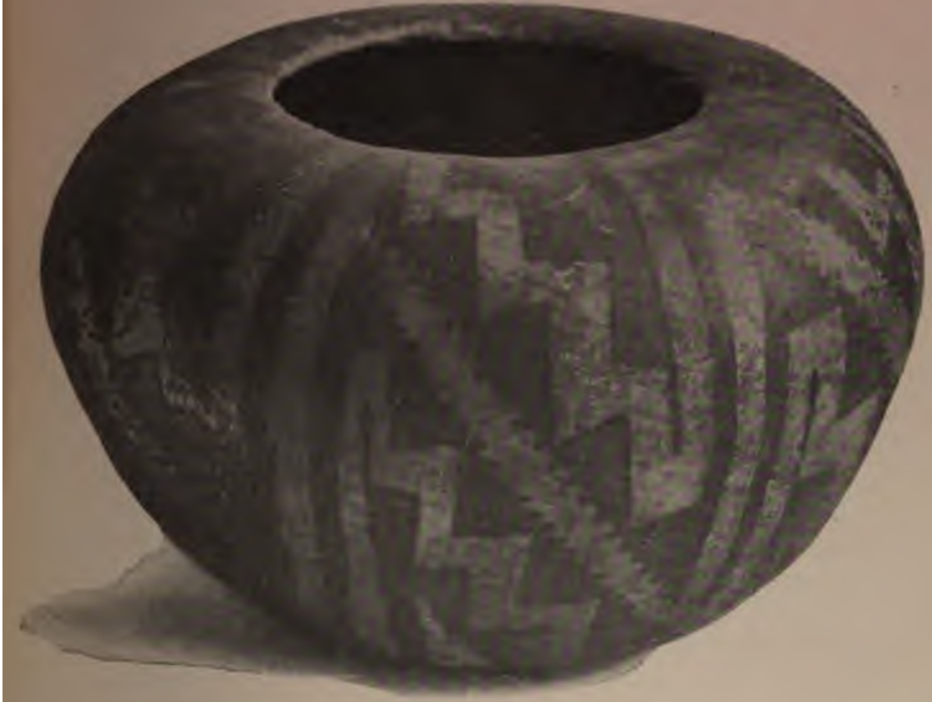

FIG. 14 — A LARGE BOWL

From ruins along the San Juan river S. 3–5

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for months, and on one occasion found hundreds of turquoise objects hidden in one of the Kivas. This rich field awaits future explorers.

Archaeologists will rejoice if Dr. Pepper is able to resume the explorations of this remarkable place and carry them to a successful termination. Having begun his work under such auspicious circumstances, it is to be hoped that he will continue. The Chaco Group is the most important in the United States, and there is abundant evidence that the culture of the whole Southwest reached its zenith there.

The party returned from the Chaco Group to Farmington, and the specimens were packed ready for shipment to Mr. Peabody. We visited the Salmon ruins on the San Juan river, about 20 miles from Farmington, finding there two small buildings that had been destroyed by fire. Mr. Salmon did not wish us to carry on explorations for greater length of time than three days, and we were unable to secure more than a few specimens. The site is interesting and merits thorough exploration. Such whole pottery as we obtained from this San Juan pueblo is as finely made as any found in the Southwest. Apparently, the pueblo was attacked, sacked, and burned while it was still occupied. By whom, may be determined after careful exploration.

The La Plata valley was visited and a few specimens collected from Boulder ruins along that stream and the San Juan. A survey under the direction of the writer in 1892 had pretty thoroughly examined the lower San Juan region. En route to Durango several collections were purchased from ranchmen at La Plata, Farmington, and Olio, New Mexico.

EXPLORATIONS AT THE MOUTH OF THE WABASH.

About August 1st, 1897, Mr. Peabody instructed the writer to proceed down the Ohio river from Cincinnati and examine various sites, mounds, and other remains, as far as the Missisippi. The services of Mr. Clifford Anderson, of Fort Ancient, Ohio, were procured, and he continued working for Mr. Peabody practically all of his time for the next three years. Anderson had served the writer faithfully on the Ft. Ancient, Hopewell, Oregonia, and other surveys, and was not only a careful and intelligent field man but seemed to know by intuition the most likely places for explorations.

Previous to the Ohio River trip, more Scioto valley specimens were obtained. Scioto types exhibit as high stone age art as have been found in the entire Mississippi valley.

The writer called upon many farmers in Ross and Pickaway counties in Ohio, and secured several hundred interesting specimens. In a gravel pit east of Circleville, while workmen were removing material to be placed upon the roads, fifteen or twenty skeletons were found one to one and a half meters below the crest of the gravel knoll. Among the ribs of one of these bodies was found a hematite plummet. Near the head of another skeleton was a bone knife handle and a tubular pipe. An ordinary flint knife lay near the bone handle, and originally may have been fastened to it.

Two mounds near Waynesville, Ohio, were on the high terrace overlooking the Little Miami river ten miles above Fort Ancient. Both mounds were promising, but the exploration of each was a disappointment. Burnet mound was about five hundred yards north of the river. It is two meters in height and about 30 by 20 meters in diameter. An ash pit, two cremated skeletons, and three decayed skeletons were observed. The only relic discovered was a flint knife. The Mason mound is half a mile farther up the river, one and a half meters high and twenty-five meters in diameter, circular and surrounded by a circular embankment. The circle is forty-two meters in diameter, and the inner trench, or moat, is very deep—perhaps two

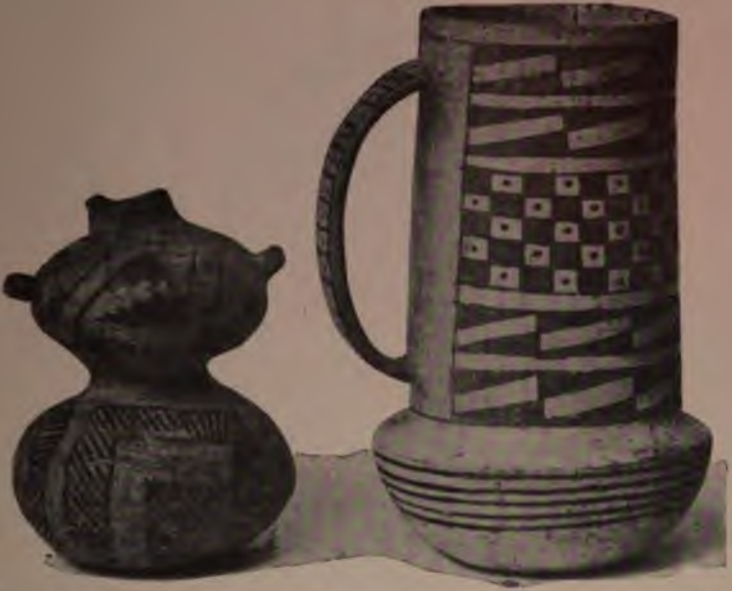

Fig. 15 — A PITCHER AND DOUBLE JAR FROM THE CHACO
S. about 2-5

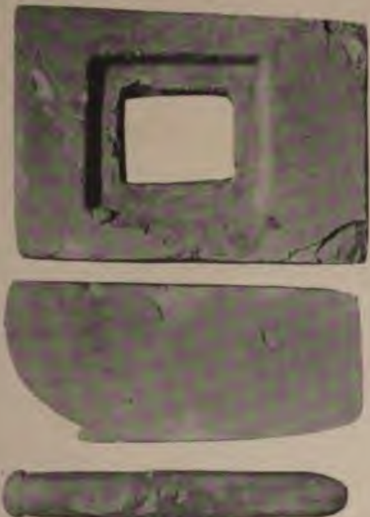

Fig. 16 — A STONE WITH SQUARE HOLE, (for unknown purpose)
A SANDAL LAST, AND A STONE SWORD FROM
THE CHACO S. about 1-6

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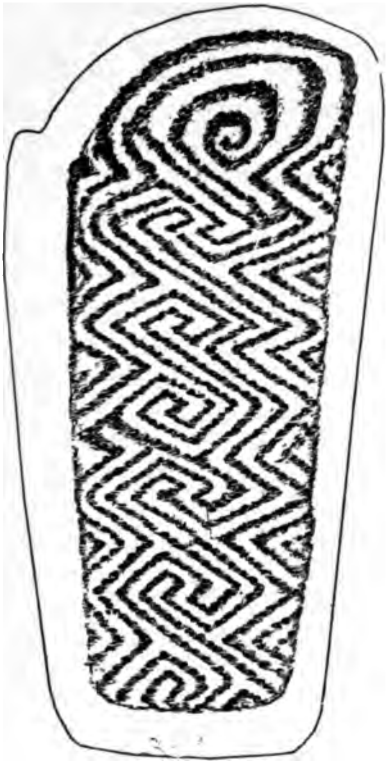

Fig. 17 — CLAY SANDAL LAST, BUTLER CANON, UTAH
S. 1-3

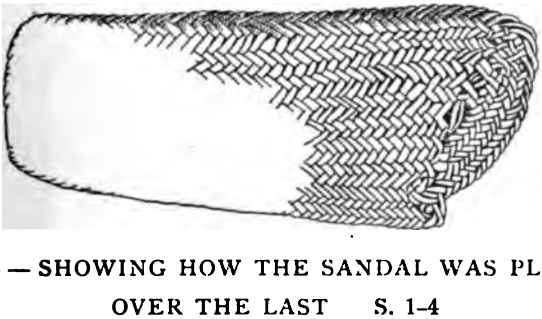

Fig. 18 — SHOWING HOW THE SANDAL WAS PLAITED
OVER THE LAST S. 1-4

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meters. Both are splendidly preserved. Tne owner would not permit the mound to be thoroughly explored, but said that we might sink several shafts, which revealed nothing beyond a large bed of ashes and masses of burnt clay. We found a pestle in the edge of the embankment, but that find has no connection with the burial proper, and the pestle was undoubtedly lost or dropped by some passing native. The earth was thrown back, and both mounds were left in practically the original condition.

Barren mounds are rare in the Ohio valley.

During August, 1898, we located at Oregonia, and examined the village site at the mouth of Caesar's creek on the farm of Mr. Hiram Taylor. This is in Warren County, Ohio, five miles north of Fort Ancient. On Mr. Taylor's farm the expedition from the World's Columbian Exposition in 1891, under the writer's direction, opened upwards of 120 stone graves. The finds were typical of the Fort Ancient region.

About August 10th we proceded down the Ohio river from the mouth of the Great Miami to Lawrenceburg and Aurora, Indiana. There were numerous collections in the neighborhood, and most of these were purchased. Five miles up Loughery creek (west from Aurora) is a large village site. Numerous excavations were made, but we were unable to locate the refuse pits and lodge circles. Some future expedition will find these, no doubt. From thence the survey moved to Holmes mound, three miles down the Ohio river from Aurora. This is a part of the largest village site ever observed by the writer in any section of America. While the culture seems to have been low, yet the abundance of surface material would indicate that the village extended for five or six miles along the north bank of the Ohio river, or that there were several villages here located at different times.

The banks of the Ohio river from the mouth of the Kanawa in West Virginia to the Mississippi at Cairo, Illinois, exhibit traces of prehistoric village sites every few miles. On both the Ohio and Kentucky sides at the mouths of the Scioto, Licking, Muskingum, Little and Great Miami, and a score of other streams the sites appear to be of great extent. On the Kentucky side above Portsmouth, Ohio, great quantities of bone implements have been found and it appears to the writer that

FIG.

ON OF THE MAP. FIGURE 19.

iontown, Kentucky, he learned from a store keeper
number of skeletons on the Sullivan farm. Anderson
n the orchard (there was much village site debris on
small cemetery (A). This was about 15 m. square.
rials, those nearest the surface being about one-third
xt layer some of the skulls and vessels were crushed,
e horses used in plowing. The pottery and the skel-
layers were in good condition.

natives buried deeper than one and one-half meters.
f that deep. It seemed to me that all of the skeletons
ildren, at least many of the skeletons were children

map, I found skeletons of adults with pipes, flint im-
s, and a few vessels of pottery. The copper spiral
d shoulders, and were probably used to twist around
tery was about 5 m. wide and 50 m. long. I was not
traw stacks."

nd cemetery C, where there were fragmentary skele-
pottery. These burials were near the surface. He
cemetery.

the site might result in finding other burials, although
k many experimental shafts in the orchard and else-
sely exaggerated in this map, the orchard being out of
om the house to the Ohio and Wabash rivers. The
vers and the house and the barn is exceedingly low,
likely that natives did not live there.

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he Posey Co.

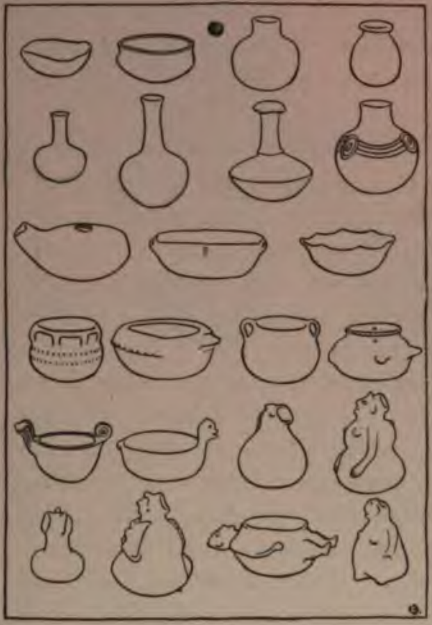

FIG. 20 — GROUP OF POTTERY

From the cemetery at the mouth of the Wabash river, Indiana S. about 1–15

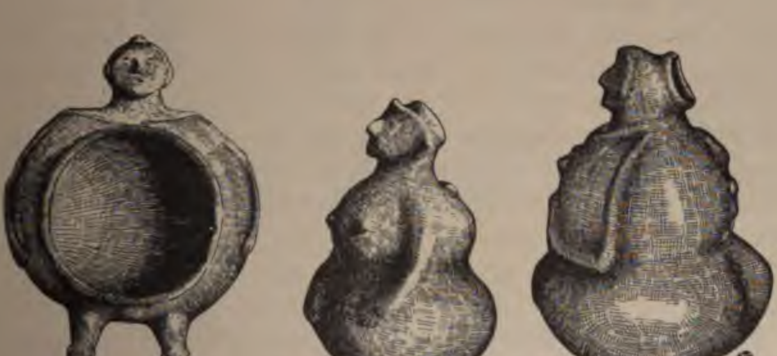

FIG. 21 — THREE EFFIGY BOWLS

From the Wabash cemetery S. 1-5

there is an interesting field for future exploration. These village sites are not necessarily extensive where the great earthworks are located. The earthworks in the Ohio valley have attracted more attention on the part of scientists than the village sites and it is only in the last decade that these have been explored.

From above Lawrenceburg to two or three miles of Aurora, Indiana, there is an almost continuous village site, the ground being covered with broken stones, pieces of pottery, mussel shells, etc. During ten. days' work we found and purchased a collection of more than 3700 specimens. Three or four small mounds were opened and some plain bowls, one or two pipes and skeletons were found. The village sites certainly merit a thorough exploration. The workmanship is crude, the natives seem to have left no artistic objects. Between Lawrenceburg and Aurora the banks were apparently occupied by large numbers of natives who spent their time in hunting and fishing. Some Flint Ridge flint was discovered although many of the knives, spear points, etc., were made of nodular flint from Tennessee or Indiana. Local chert was chiefly employed. Stone celts are very common. Nearly a thousand of all kinds were obtained.

There were six mounds on the high terrace, within a third of a mile of the Ohio river. Three of these we were permitted to open; the others the owners wished to preserve. Number two was two meters high and thirty four meters in diameter and contained seven skeletons. None of these were well preserved and there was no regularity with reference to position or depth. With two of the skeletons were found two crude bowls, more northern than southern in type. There was some Flint Ridge material upon the surface. Both these facts are important and should be carefully noted.

These mounds are of the type common in the Ohio valley, south of the state of Ohio. The exploration of a large number of them would probably be of little consequence to science, as they appeared to be burial mounds pure and simple, each more or less different from another in detail and none of them represented any new facts, save that the Southern culture did not ex

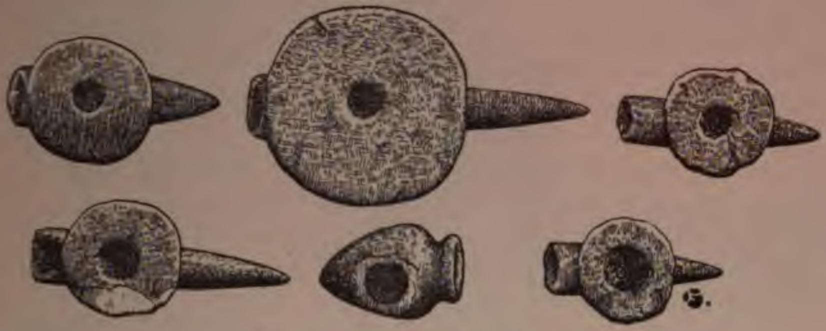

FIG. 22 — PECULIAR PIPES

From the cemetery on the Wabash S. about 1-2

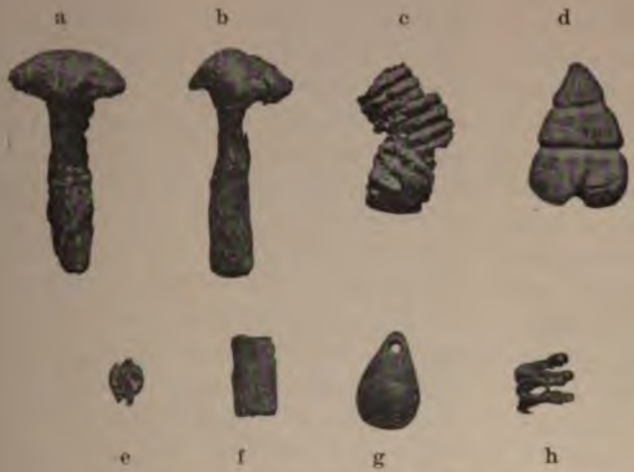

FIG. 23 — COPPER AND STONE PENDANTS

From cemetery at the mouth of the Wabash S. 1-2

a and b—Wooden object covered with a thin sheet of copper.
c and h—Copper spirals.
f—Small copper finger band (?).
d—Ornament of cave gypsum.
e—Small ear drop of stone.
g—Amethyst bead or earring.

tend to them, or that they were built either before or after that epoch.

August 21st. after ten days about Aurora and Lawrenceburg, we went to Patriot, Indiana, but found nothing of consequence. At Uniontown some graves and a village site at the edge of the town were opened. Although several skeletons were exhumed, nothing worthy of note was discovered.

From Uniontown we visited Rising Sun, Indiana, and the Big Bone Springs in Kentucky. The swamp (also known as "Bone Lick") is extensive and its waters were supposed to possess curative properties. In the ante-bellum days a group of hotels sprung up about the resort.

Numerous large bones and one mastodon skeleton have been taken from the swamp. In spite of specious pleas, permission to explore was refused us. Mr. Peabody desired to have the swamp examined in order that he might obtain a mastodon skeleton and ascertain if there were any implements due to human agency among the bones of the extinct mammals. The owner, a venerable gentleman, in refusing us, justified his objections on rather peculiar grounds. The writer had heard many excuses given as to why owners did not care to allow explorations; but never for the reasons named in this case. He said that the Almighty had placed those monsters in the swamp for some special purpose and he, the owner, being a very religious man, would not have them disturbed.

Returning from the Bone Springs to the Ohio river, the writer instructed Anderson to proceed to the mouth of the Wabash. Anderson first tried the Kentucky side of the river but found nothing of consequence. Then he settled for the autumn on the Sullivan farm, Posey County, Indiana, near the mouth of the Wabash, on the east bank. The writer's health compelled him to abandon the field, and he returned to Columbus.

In fig. 19 a plan of the village site is presented. During two months spent in excavating, Mr. Anderson exhumed 157 skeletons. These varied in depth from one half to one and a half meters beneath the surface. It was observed that the bodies were all buried extended, the arms usually straightened at the sides. No regularity was observed with regard to the points of the compass although possibly more skeletons lay with the head

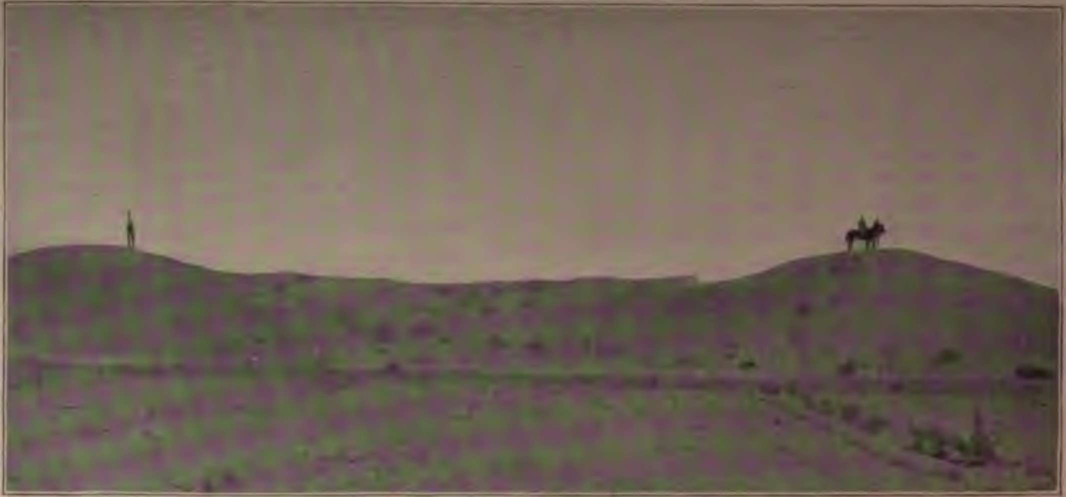

FIG. 24 — LARGE RUIN AT MESA, ARIZONA

This appears to be the highest and longest single ruin in the South-West

to the north than in other directions. It is interesting to note that nearly all of the pottery was placed either on the left side of the head, at the shoulder, or behind the head. This may or may not carry significance. It seems likely, however, that such uniformity of position of the bowls, jars and bottles would not be observed unless the natives had some special idea in view. It must be remembered that in the smoking ceremony the pipe is usually received from the left. In many of the bowls there were mussel shells, frequently cut and trimmed. Apparently, these served as spoons and ladles.

Occasionally skeletons were buried across each other. At first it was thought that two or three had been placed in the same grave but later it became apparent that the first skeleton was buried at considerable depth. Subsequently another grave was dug at right angles to the first and a second (and sometimes even a third) interment was made on the same spot. What time elapsed between the interments it is impossible to determine.

Figs. 20, 21, 22 and 23 present the pottery, beads and copper objects, found in these graves.

There is pathetic interest in the fact that many children skeletons were found during the course of the explorations. The mothers placed alongside the little bodies clay toys, such as rattles, miniature dishes, bowls and bottles. These served the same purpose in ancient times as do the toy dishes and playthings used by our children. There were also pendants, small shells, shell discs and other ornaments buried by the head or at the wrists of these infants and children.

The toy dishes are crudely made, some of them not even baked. Often small, waterworn pebbles had been placed within the toys.

The Wabash cemetery is peculiar and interesting in that it marks the farthest extension north of the southern ceramic art. The types are those of Arkansas, Missouri and Tennessee. As the village site on the west bank of the Wabash appears to have been extensive, it is probable that the natives crossed to the east bank and there resided. But there are no indications as yet discovered of a farther extension up the Ohio river. Certainly at Lawrenceburg and Aurora the types are *northern* and not southern in character. It is quite evident, therefore, that the Wabash marks an important dividing line between the North and the South. If future explorations should prove that southern pottery is found in any considerable numbers north or east of the Wabash, the writer's statement made above is an error, but up to the present at least, no such indications are apparent. The natives may have ascended the Wabash itself for some distance. An aged steamboat captain told Anderson that many years ago a large village site and burial ground was exposed ten or twelve miles above the mouth of the river by a spring freshet. The writer is unaware of any reference in archaeologic literature, to the site referred to by the captain.

Copper found in the graves is in the form of spool shaped ornaments, spirals and beads. All of them are small or thin and much oxidized, therefore it is impossible to state positively whether they are prehistoric or of European origin. But the copper appears to be ancient. No Flint Ridge material was found in this site and projectile points, etc., of nodular flint predominated. The ears of two or three of the effigies are perforated for insertion of earrings.

A few cemeteries have been completely explored, yet this cemetery is manifestly southern and the graves are more or less repetitions of the same story. Several hundred such sites have been known, particularly around Nashville, Tennessee, where thousands of graves have been opened. The same is true of Memphis and of certain localities in Arkansas. The population must have been considerable. The position of a skeleton and the accompanying objects may or may not signify something special. In order to present all the facts, Anderson's detailed report on each burial is inserted at this place.

During September, October and November the writer directed Anderson's operations by correspondence, received the various specimens he had found, cleaned them and shipped them to Mr. Peabody. The latter part of November, 1897, the writer and his family located in Phoenix, Arizona, where they remained until June, 1898.

It will be observed, by those interested in archaeology, that this record emphasizes several points.

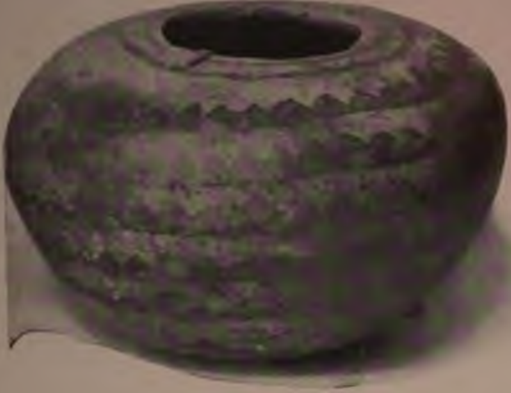

FIG. 25 — BOWL

From a cliff house up the Verde river, Arizona S. 1-2

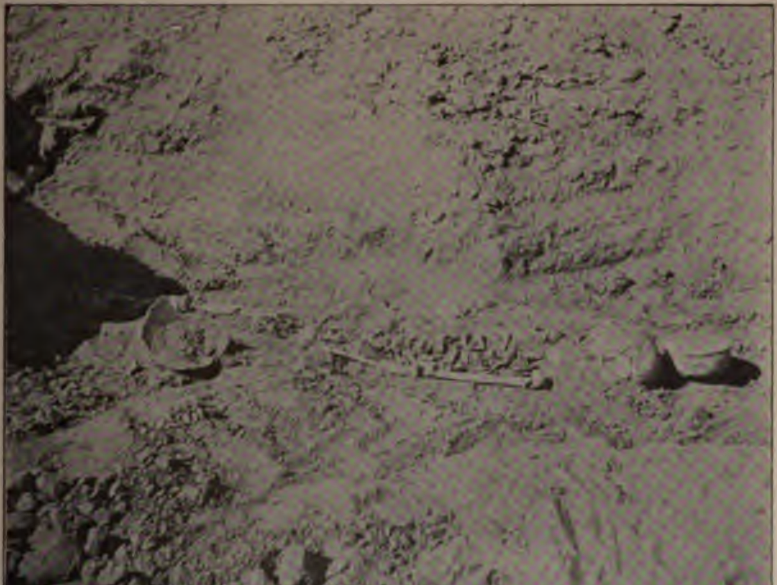

FIG. 26 — SKELETON AND BOWL

From the Kalfus ruin west of Phoenix, Arizona

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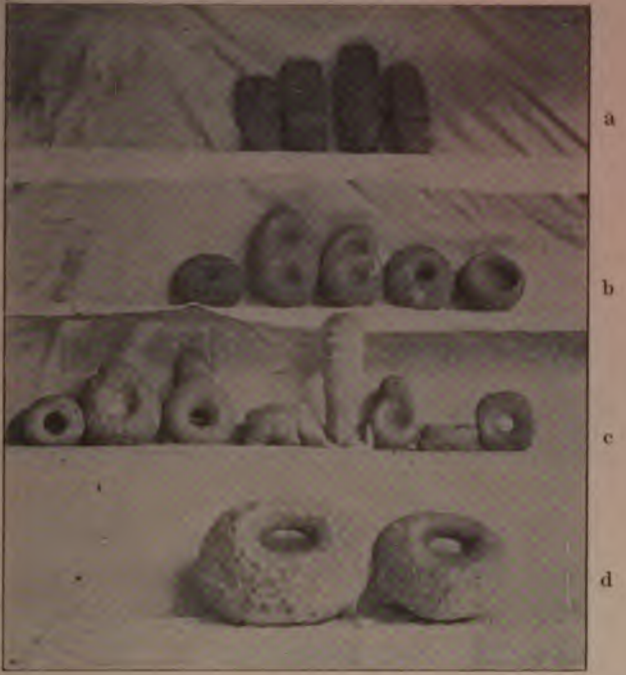

FIG. 27 — GROUP OF OBJECTS FROM THE SALADO VALLEY RUINS S. 1-7

a—Axes.
b—Small mortars and "rings".
c—Rings and "unknown forms".
d—For preparing potters' clay (?).

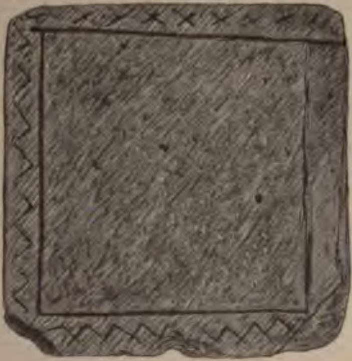

FIG. 28 — SLATE TABLET FROM THE KALFUS RUIN
S. 1-2

Other slate tablets are larger and smaller, but with depressed centers. Cushing said that on these ceremonial paint was mixed.

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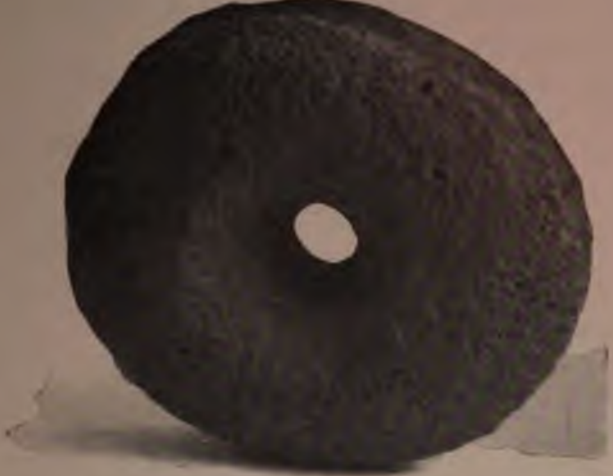

FIG. 29 — PERFORATED STONE DISC

Ruin near Mesa S. 1–2

Many of these are found.

An extended reference to them was published in the *American Anthropologist*, April, 1889. Mr. Lorimer Fisson had observed their use among the natives of New Britain (in Melanesia). There the native men made use of it as a head to a war club. The Australian women used it to weight a digging-stick, but when the village was attacked, employed it as an effective weapon. The grooved-perforated stones were "fixed on the handle with the grooved side undermost, and this groove is filled up with gum in which is set, for ornament, I suppose, a circlet of small shell-tips, which, threaded on a string, are the money currency of New Britain."

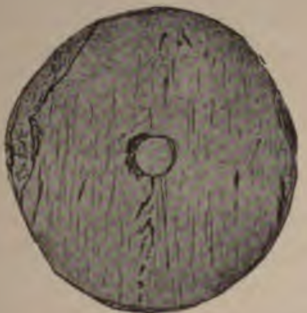

FIG. 30 — PERFORATED POTTERY DISC

Ruin south of Phoenix S. 1–1

First. There is no preference as to how the burial "heads" with reference to cardinal points.

Second. Pottery is usually back of the head. This may carry significance.

Third. Objects not regarded as pottery, although cup-shaped, are buried at the wrist or shoulder.

Fourth. That there were several deposits of detached crania with lower jaws missing. (Between numbers 62 and 76.

The field notes are left just as Anderson wrote them — abbreviations and all.

Sept. 1st., I made out my report and answered Mr. Moorehead's letter. Procured packing material and went over to the Sullivan farm in Posey Co., Ind., near the mouth of the Wabash. That afternoon and next morning my prospect holes brought nothing to light.

In the afternoon I looked over the site and observed that a ditch surrounded the village site. I found large fragments of pottery upon the surface indicating pots as large as medium sized wash tubs. I began to work upon the edge of the moat or ditch and excavated about 3 feet in depth, carrying the trench straight ahead.

Skeleton No. 14, headed south, child. No relics.

Skeleton No. 15, directly below the child, headed east. Water bottle made to represent a woman at the right shoulder. Broken bowl at the left of the head.

No 16, headed west, nothing.

No. 17, headed west, effigy bowl at left of head.

No. 18, headed west, small pot at right elbow, water bottle at left of head.

No. 19, headed east, nothing.

No. 20, headed west, water bottle at left of head. Small bowl behind head.

No. 21, child's skeleton, 28 bone beads around the neck.

No. 22, headed east. Pot at left of head with squirrel bones in it. Small pot near right arm.

No. 23, headed west, nothing.

No. 24, headed east, nothing.

No. 25, headed east, octagon bowl and small pot behind head.

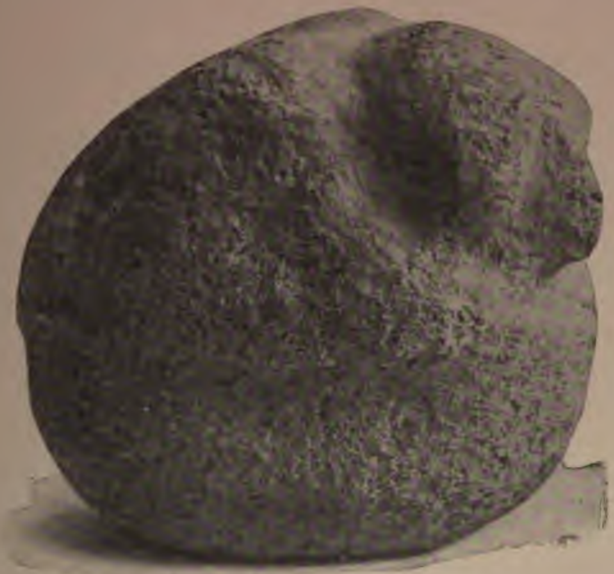

FIG. 31 — EFFIGY OF AN OWL

From large ruin near Mesa S. 1-2

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No. 26, headed west, 2 badly broken bowls behind head and one at left shoulder.

No. 27, headed west, effigy bowl and pot behind head.

No. 28, headed west, 1 small broken bowl, 1 broken effigy bowl, 1 water bottle broken, behind head.

No. 29, headed east, 2 plain bowls behind head, 1 effigy bowl at left shoulder.

No. 30 headed west, 1 effigy bowl at left of head, water bowl at right of shoulder.

No. 31, headed east, effigy bowl and scalloped bowl behind head.

No. 32, headed east, water bottle at right shoulder and pot behind head.

No. 33, headed west, small bowl behind head and water bottle at left shoulder.

No. 34, headed west, child's. Heart shaped stone ornament at neck.

No. 35, headed west, 2 pots behind head. Across the knees of No. 35 were two other skeletons; No. 36 headed north and No. 37 headed south. Two water bottles were wedged in where the bones crossed This place must have been used a long time and burials made years after the first, without reference to previous graves.

No. 38, headed north, two shattered pots at left of head.

No. 39, headed east, shattered pot at back of head and broken vessel at right hand.

No. 40, headed west, two pots behind the head and one at the right elbow.

No. 41, headed west. Two pots behind head.

Nos. 42 and 43, headed west. No. relics.

No. 45, headed west. Two pots behind head, water bottle at left of head.

No. 46, head south, broken bowl and fragments of effigy, water bottle at left of head.

No. 47, headed east. Two small pots behind water head, water jar left of head. One pot contained mussel shell.

No. 48, head west, broken dish and fragment of dish behind head. Broken effigy bowl left of head.

No. 49, head east, effigy bowl and pot behind head. Water bottle left of head across pelvis child's.

No. 50, perforated stone at neck. Small bowl at head.

No. 51, head east, broken pot and two broken bowls behind head. Small paint cups at right wrist. One bowl contained mussel shell.

September 9th. No. 52, head east. Broken dish and two broken bowls behind head. Two small paint cups at right shoulder

No. 53, head north, bowl containing smaller bowl behind head. Water bottle at left shoulder. Broke bottle slightly with shovel

No. 54, headed west. Water jar and small bowls left of head. Paint cups left wrist

No. 55, headed to north. Two broken pots left of head. Broken water bottle behind head.

No. 56, headed south. Broken water bottle behind head. Broken dish left of head. Paint cup right arm across breast child's skeleton.

No. 57, head south. Small cup on shoulder. Sea shell ornament on right arm.

Sept. 10th. No. 58, headed south. Effigy water bottle left shoulder.

No. 59, headed west. Small pot and water bottle behind head.

No. 60, headed north, large pot behind head. Effigy water bottle left of head.

No. 61, headed north. Small pot (rim broken) and water bottle behind head.

No. 62, headed south. Water bottle on left of head.

Report for week ending September 16, 1898. Seven fragmentary skeletons, no relics. One heap of five skulls, no under jaws or other bones. One heap of skeletons fragmentary, with three skulls. One heap of skel's fragmentary, with seven skulls. One heap of skel's fragmentary with five skulls. One heap of skel's fragmentary with four skulls.

Skel. No. 76, head south. Copper ornaments and bone break on neck and wrists.

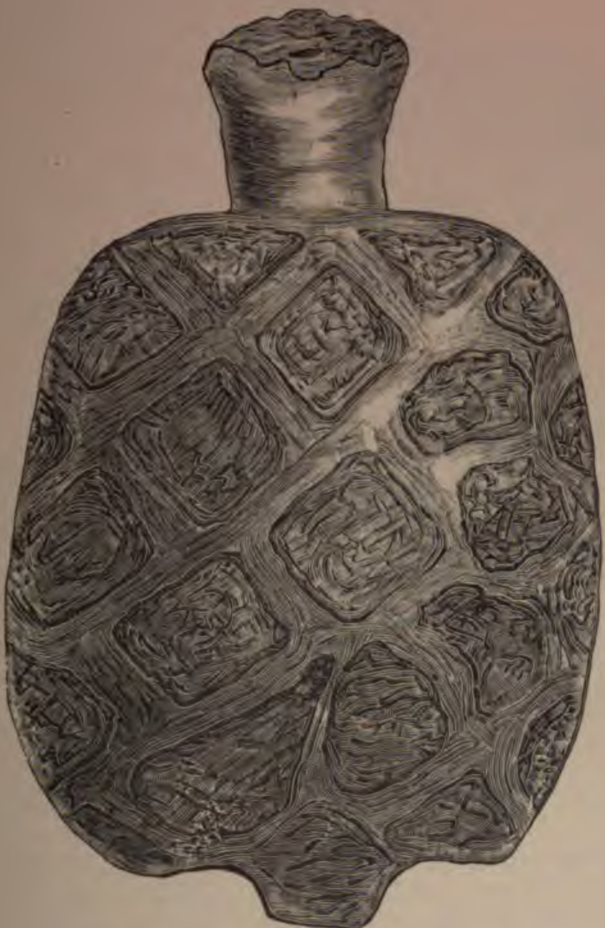

FIG. 32 — EFFIGY OF ARMADILLO (?)

Salado valley S. 2-3

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No. 77, head south. One shattered pot at head. One effigy bowl at head. Discoidal at pelvis.

No. 78, head east. Two small pots behind head. Pipe on right shoulder.

No. 79, head north. Spear head on right foot. Discoidal at right shoulder, two pots behind head. Small cut at left wrist.

No. 80, head west, no relics.

No. 81, head south. Two pots behind head, one containing shell. Pipe at left hand. Bone implement on right knee.

No. 82, head east, two spear points at right shoulder. One shattered pot and one pot containing shell behind head.

No. 83, head south. Squared bone at right knee. Copper ornaments and bone beads on neck and wrists. Bone ornaments on wrists, unfinished discoidal near left wrist. Ear pendants at head.

No. 84, child, headed south. Worked bone at pelvis, copper beads at neck.

Week ending September 24th, 1898 — One group of fragmentary skeletons. Three skulls, no under-jaws. Seven fragmentary Skel's found separately. No relics.

Skel. No. 85, head north. Shattered pot at head. Arm bone perforated.

No. 86, head west. Skull perforated. Pot with shell, and shallow bowl behind head.

Nos. 87, 88, 89, 90 and 91 buried side by side, heads north. Two of them, 88 and 90, were children. No relics. The others each had a shattered pot behind head. Directly underneath were Skels. 92 and 93, heads north, without relics, and Skel. 94 with two pots behind head, each containing a shell.

No. 95, child. Head east. Coal ornament on heart. Copper and beads at neck. Copper stained arm bones.

Skel. 96, head north. Effigy bowl and shallow bowl behind head, notched shell left of head.

No. 97, head south. Copper rings, ear pendants, etc., at head and neck. Spear and arrow point at left shoulder, pipe at right hand, spear at left knee.

No. 98, head south. Effigy bowl with shell and water bottle behind head. Bone, awls, needles, and flakes of bone and war paint at right of head.

No. 99, head west, no relics.

No. 100, head south. Ear pendants, shell beads, and copper at neck and head.

No. 101, head north. Pot and bowl behind head each containing shell. Found an oblong bowl in dirt, no shell near it. Broke bowl with shovel.

No. 102, head north. Twenty bone beads around neck.

No. 103, head north. No relics.

No. 104, head north. Stone pipe on left shoulder. These last three were side by side.

Week ending Sat., October 1st — Group fragmentary Skels. four skulls, flint celt and deer antlers with them. Edge of pot was broken and I broke it some with shovel. The group of fragmentary skel's, four skulls, no relics.

Skel. No. 105, head east. No relics.

No. 106, head south, perforated shells, copper and shell pendant at neck.

Nos. 107 and 108. Heads north and buried side by side. No relics. Arm bones of 108 perforated.

No. 109, head north. Pipe on left shoulder. Two arrows at right shoulder and spear point at right hip.

No. 110, head west. Water bottle with neck missing and Effigy bowl with shell. Edge of bowl somewhat broken.

No. 111, head south. Bear teeth at neck. Discoidal and stone ball at left wrist. War paint near left shoulder and deer antler near left elbow.

Nos. 112, 113, 114, 115 buried side by side. Heads north. 114 and 115 No relics. Small pot with rim broken at head of 113. Broke pot some with shovel. Pot had shell inside. Skel. 112 had oblong bowl (with shell inside) behind head. Found fragments of a large bowl or pot in ash pit, containing four small cups and a piece of sandstone with groove in center.

No 116, head west. Small pot with shell inside behind head, scraped pot with shovel.

Week ending October 8th, 1898 — Found nine Skel's. (Nos. 117, 118, 119, 120, 121, 122, 123, 124, 125,) side by side, heads to south and about ten inches in depth. All but 121 had a fragmentary pot or bowl at head. Beneath there were — Skel.

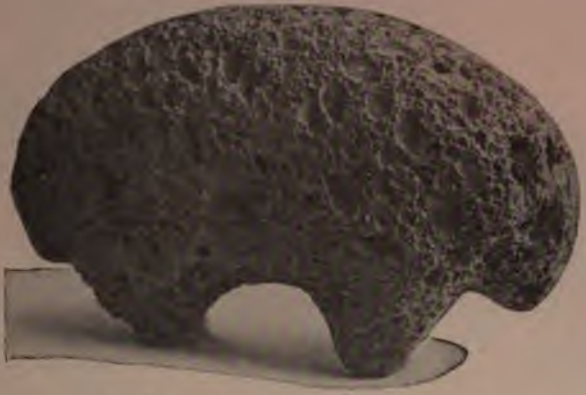

Fig. 33 — EFFIGY OF A BEAR (?)
Salado valley S. 1-2

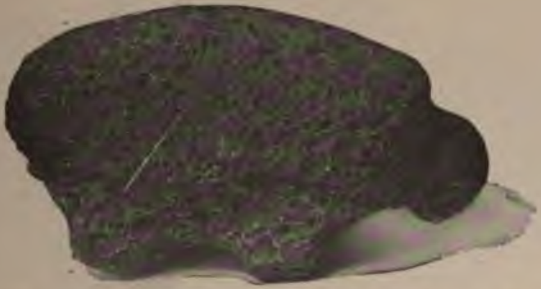

Fig. 34 — EFFIGY OF AN UNKNOWN ANIMAL OR REPTILE
Salado valley S. 1-3

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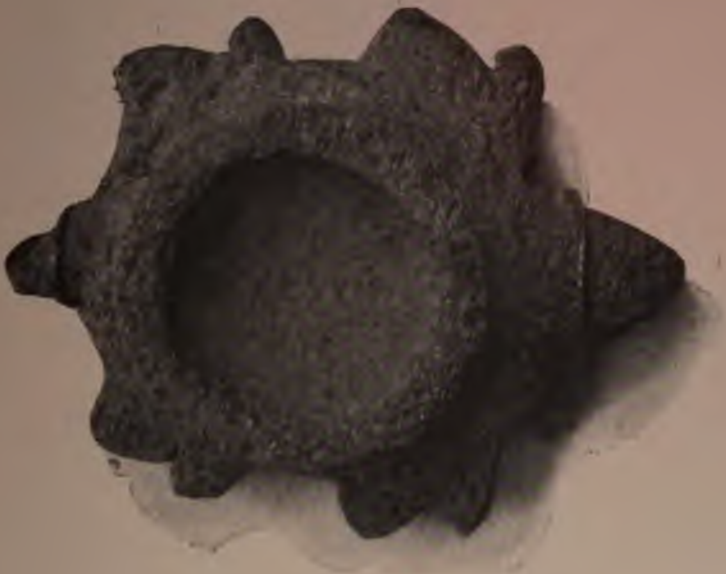

FIG. 35 — EFFIGY MORTAR (?)
Salado valley S. 1-1

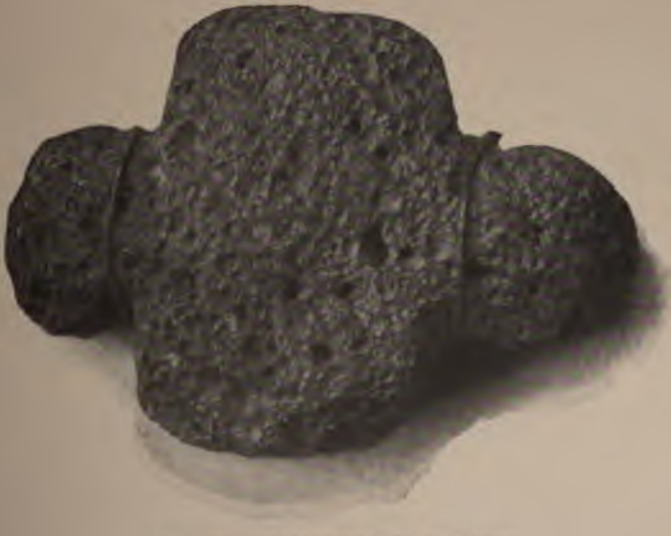

FIG. 36 — UNKNOWN OBJECT
Salado valley S. 1-1

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126, head south, four arrow points at left forarm, bowl with shell at left of head. Flint knife beside pot.

Skel. 127, head south, copper ornaments at each side of head.

Skel. 128, head south, pot with shell behind head.

Skel. 129, head north, pot with shell and small cups behind head.

Skel. 130, head north. Pot at left shoulder. Beneath Skel's. 126, 7, 8, 9, and 130, were Skels. 131, head south. No relics, had a child's skel 132, laying across breast and pelvis which had 25 bone bead around neck. Skel. 133, head north, Small pot with handle missing and bit of mica in it.

Skel. 134, head north, Small pot and Effigy bottle behind head. In other trenches were Skel. 135, head south, water jar fragment pot behind head.

Skels. 136, 137 and 138, heads with no relics. Skel. 139, head south, bowl with shell on left shoulder, spear at right forearm. Skel. ornaments at left hand and forearm, worked bone at right shoulder, (probably the handle for the spear or knife at right forearm).

No. 140, head sonth. Bowl made of a broken water bottle on left shoulder. Found group of skels. intermingled with six skulls. Saved two of the skulls though in poor condition, and extra large arm and leg bones. Found crushed pot in dirt, no skeleton near it. Skels. 141, 142; side by side; heads north; no relics. while digging dirt off above I struck a pipe with shel. 143, who was lying directly above 142. Broke pipe in two; can be easily restored. Also found spear and three arrows with 143. Pipe, arrows, etc., all at right hand and arm.

Week ending Oct. 15th, 1898—Skel. 144, head south; pot with shell behind head.

No. 145, head south, Fragment pot at right of head; four small cups at left of head.

No. 146, head south; copper at each side of head.

No. 147, head east; no relics.

No. 148, head west; no relics. These two were over lapping each other.

No. 149, head south; small pot with rim broken behind head.

No. 150, head south; pipe in right hand; one arm bone perforated. A stone of about ten pounds weight rested on the mouth, and the lower and upper jaws were badly crushed.

Nos. 152, 153, 154, 155, side by side, heads to north. No. 153 had no relics; others had fragments of pots behind heads.

Skel 156, head north; pot with rim broken and containing shell behind head; discoidal at right shoulder; two arrows at right fore arm.

Skel. 157, head south, no relics.

SUMMARY.

Skeletons headed North	43
Skeletons headed South	41
Skeletons headed West	30
Skeletons headed East	27
Cardinal point not given	16
Total	157

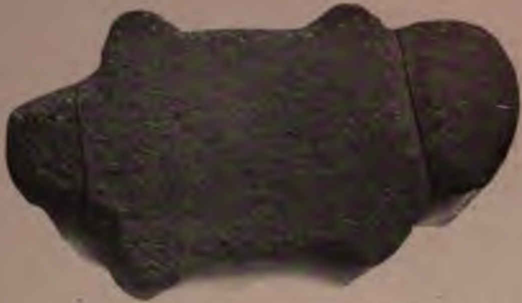

FIG. 37 — UNKNOWN OBJECT

Salado valley S. 1–2

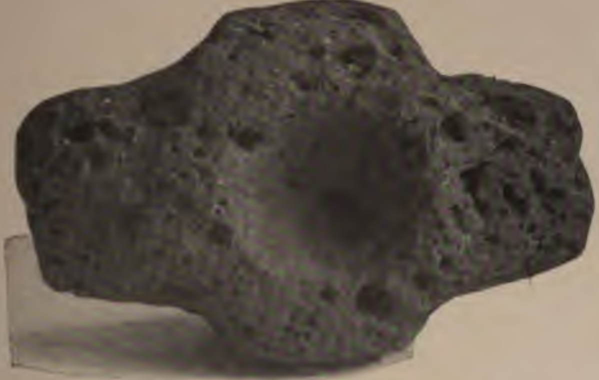

FIG. 38 — UNKNOWN OBJECT

Salado valley S. 1–2

FIELD WORK IN ARIZONA.

After a few weeks' rest, the writer examined the Salado river valley for some twenty miles above Phoenix, and ten miles to the west (down stream).

Mr. Peabody was anxious to learn of the interesting country —one quite different from the San Juan region—and he directed that explorations be made.

The many and large adobe ruins throughout the Salado valley of Arizona have long been known to archaeologists. The "City of the Dead" was explored by Prof. Frank Hamilton Cushing nearly twenty years ago, and in it were found many remarkable objects in shell, pottery, bone, turquoise, etc. It should not be forgotten by archaeologists that when Cushing announced the discovery of some shell frogs, his statements were doubted, and it was even intimated that Cushing had made one of these himself. Since that time explorers have found, in addition to shell frogs, shell and bone implements inlaid with turquoise, not only in Arizona but also in New Mexico. Thus time has more than vindicated the truthfulness of Cushing's observations.

Anything unusual or contrary to accepted notions or opinions among archaeologists may breed skepticism. When it was customary, twenty years ago, to decry Squire and Davis' discoveries among the mounds, some writers went even so far as to say that the pipe sculptures could not have been made with aboriginal tools by Indians. Had one or two such objects been found at the Hopewell Group, when it was explored in 1891–2, the same doubt might have arisen. But the Effigy mound of that group produced quantities of all kinds of unusual things. In fact the very numbers (not taking into account study of the copper, of carvings, etc) disproved such a theory. Nothing that has been found in prehistoric monuments in America (where purely aboriginal occupation is above question) is beyond the ability of the pre-Columbian natives to produce.

The art in the Salado valley was high. Yet it was different from that exhibited in the cliff dwellings farther north. Probably we have two or three cultures in the Colorado Basin, the

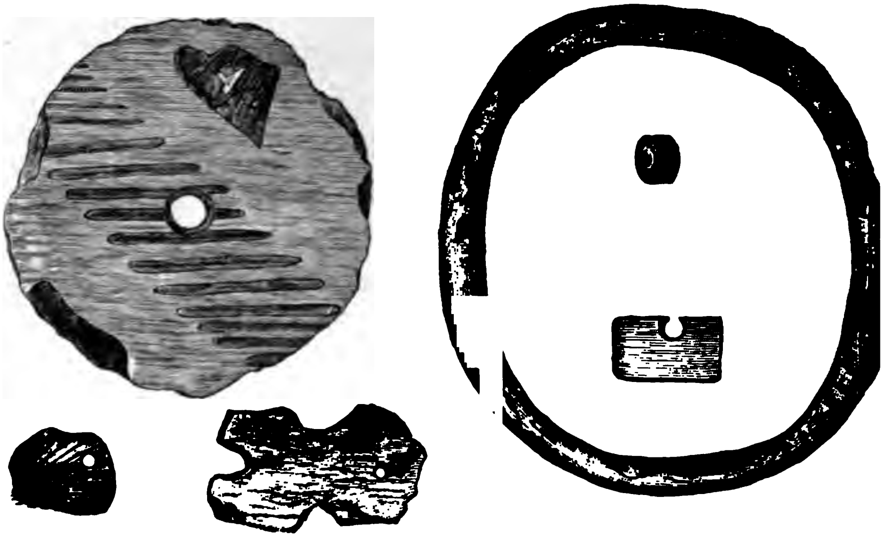

FIG. 39 — SHELL BRACELET, TWO TURQUOISE BEADS, A DEC
RATED POTTERY DISC, A SHELL AND A SLATE
PENDANT from the ruins near Mesa
S. 1-1

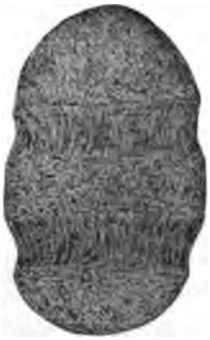

FIG. 40 — A DOUBLE GROOVED HAMMER
From ruin south of Phoenix S. 1-2

Cliff-dwellers, Boulder Ruin people, Adobe Ruin people, etc. These are not accurate terms, but they will serve to indicate the various cultures. The Basket or Cave people of Southern Utah may mark a fourth tribe.

Art in shell is characteristic of the Salado valley pueblos. Shells occur in great profusion in the ruins, and are scattered about on the desert. Either there was extensive trade with the natives living along the seacoast, or the Salado people made frequent journeys to the salt water. In the museum at Andover are over two thousands objects, chiefly shell and stone, from the ruins.

When the valley had been examined, the writer began collecting for Mr. Peabody, employing from two to seven men as occasion required. Not only were several ruins partially explored, but purchases were made from boys and from Indians. The frequent sandstorms, sweeping across the hard floor of the desert, leave exposed numerous objects, both large and small. Indeed, the number thus found is more considerable than one would imagine, and the author of this BULLETIN has frequently collected all the specimens he could transport in one afternoon, through the simple process of riding from one ruin to another upon his bicycle and keeping his eyes on the ground.

The Pima and Maricopa Indians at Tempe and elsewhere in the Salado valley make and sell to tourists, idols, mortars, rings, etc. Sometimes it is difficult to distinguish between the ancient and the modern. But in case of doubt, the writer refused to buy specimens of them. However, as some discussion has arisen regarding the age of several of the stone objects, it is well to inquire further into the subject.

As to the Salado artifacts, it must be borne in mind that the conditions in the Southwest are vastly different from those which obtain in the moist climate of the East. A stone on which is carved a snake or an unknown figure may be as old geologically as any stone in the East. Geologists may say 50,000 or 5,000,000 years, that does not matter. The age of the carving — the work of man — is an exceedingly small per cent. of the age of the stone. In the East the cutting weathers until it looks almost as old as the stone. In the Southwest it may or may not weather, or at least only slightly; depending upon the

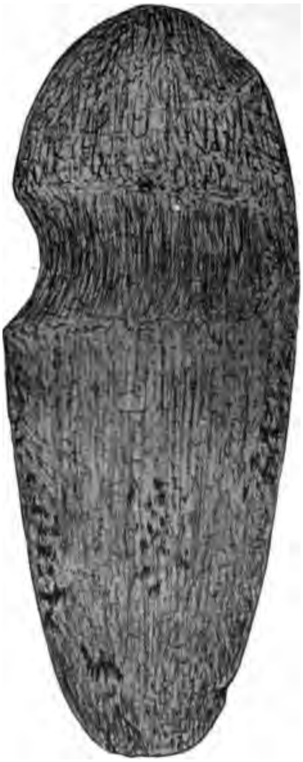

FIG. 41 — TYPICAL AXE OF THE SALADO REGION

Ruin south of Phoenix S. 1–2

conditions whether it is buried, or lies upon the surface or in a depression, or rests upon a knoll. Yet it may be a thousand years old. The dryness of the salt valley need not be commented upon here. It presents a condition totally different from that of the East. On this account picture writings upon the rocks are frequently scarcely weathered, and, although of designs manifestly not modern, look very fresh. Pictographs on rocks, overlooking the Licking, Ohio, or Susquehanna rivers of the East, have disappeared.

Many of the relics themselves are made of soft limestone, or a chalk-like formation, shales, etc. Others are made of hard granite boulders, lava, and sandstone. The softer stones have worn considerably all over, and, if their history was not known, might be considered by museum men as frauds, whether dug from ruins or bought from Indians. Some of the cuttings on the harder stones look rather fresh, as has been remarked.

There is an unfinished axe in the Andover museum which appears as "fresh" as if made yesterday. This object was found on a high terrace bordering the Merrimac river in Massachusetts in dry, white sand five feet deep. Its age is beyond question. Equally fresh tracings on desert boulders are to be seen. Some of them, preserved in the Andover Museum, may have been pecked by modern Indians—particularly those designs relating to the snake, lizzard, turtle, and bird.

At Mesa, Arizona, (18 miles from Phoenix) is an adobe ruin about 13 meters high and nearly 220 meters long. Cushing considered it the most promising of that entire region.

With a force of five men the writer spent a week in digging in the upper rooms. Some of the objects discovered are shown in figs. 39, 46, and 51, and the mound in fig. 24. However, the building is so extensive that the work done appears insignificant —a mere scratching. A careful estimate, based on the cost of the large Hopewell Mound (the effigy which was 170 x 70 x 7 meters), places the cost of exploration of Mesa ruin at more than $17,500. Scattered about, and within 200 meters, are fifteen or more smaller ruins.

A peculiar feature of life in the Salado valley is the mescal pits, the pottery kilns, etc. Some pits contain slag and other evidence of great heat. These places are numerous along the

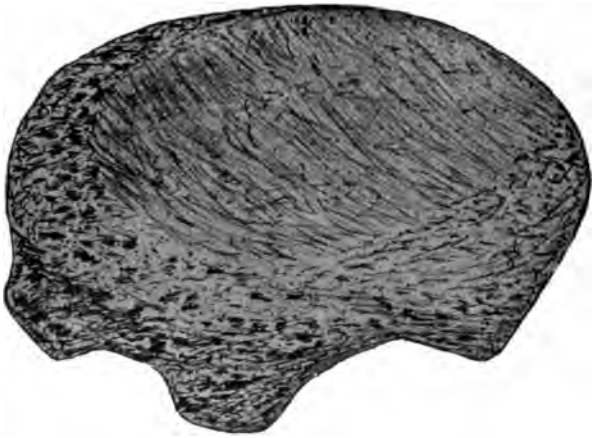

Fig. 42 — EFFIGY MORTAR (?)
Salado valley S. 1–2

Salado, particularly near Mesa. Some are more than six meters in diameter.

Six miles south of Phoenix, near the foot of a high ridge, is a pit three meters in diameter surrounded by a circle of burnt stones. There is a well defined "rim" a meter wide and fifteen cm. higher than the surrounding soil. Near by is a circle of burnt stones, but no depression.

There are several small ruins, on the south side of the Salt River opposite Phoenix, (and one large one) in this group. They range from five miles directly opposite (south) of Phoenix and about two miles beyond the Salt River, to one mile east and one mile west along the same. Our excavations in the smaller ones indicated that they were simply open air camps or refuse heaps — the accumulation of long cooking, etc., in one place. But our work in the larger ruin was productive of good results. We found that it was some 120 meters long and 90 meters wide and stood two stories high. But that it was of such great age that the adobe bricks have nearly disappeared. Some of the rooms have been fairly preserved. It appears to have been two stories high. The walls were thick, the lower rooms some two to two and a half meters in height. Today the ruin appears as a mound and stands about four meters high, being sand-covered. About one and one-half meters below the present surface there appears to be a hard floor, not so much of adobe as of packed clay, and upon this floor at various points we found axes, some rude effigies of tufa, metates, mano stones, rings, etc. We also found three skeletons, and the crania of two of these were preserved. Low walls of rooms are observed. But the upper portions of the walls have disintegrated, and they now stand about one meter high. The writer thinks that the floor indicates a second occupation of the ruin. Some wandering tribe came along and levelled off the top of the structure and constructed thereon some low rooms. After they had departed (leaving such relics as we found) time levelled their walls. No trace of roof was found; the logs and thatch having completely perished.

In figs. 39 and 45 are exhibited some of the specimens here found. Wishing to explore the whole ruin, seven or eight men were employed, and for three weeks continued digging steadily.

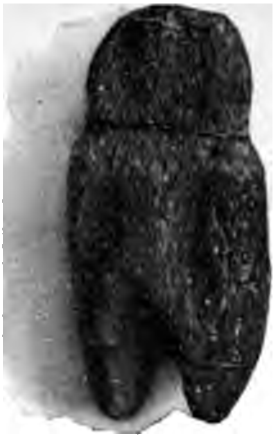

Fig. 43 — EFFIGY OF AN OWL (?)

Salado valley S. 2–3

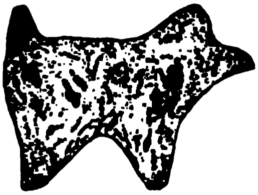

Fig. 44 — CLAY EFFIGY OF AN ANIMAL

Salado valley S. 1–1

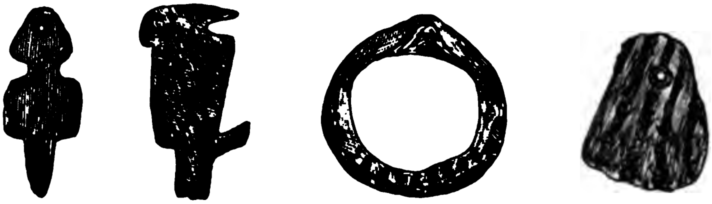

Fig. 45 — SHELL PENDANTS, RING AND EFFIGY

Salado valley S. 1–1

Twenty feet from the edge of the outer wall we found a circular depression half a meter in diameter and 25 cm. deep. There were no ashes in it, yet it was burned to the hardness of brick.

Near the further edge of the ruin, from this circular basin, were found some forty axes of greenish granite. Twenty-two of these were in one room — a small room, as indicated by the wall bases. There was little difference in the forms of the twenty-two axes, and the material was identical. Indeed, the same patterns prevailed, all the axes being three cornered, sharp and beautifully worked down to a tapering edge. These implements may have represented the stock in-trade of the pueblo, or the axe maker may have lived there. Caches of chipped implements are common, but of axes such discoveries are rare.

It should be stated that the ruin at Mesa is upon a raised platform two meters high, and that the terrace upon which the ruins are located is eleven meters above the river. There is a circular depression near at hand which is sixty meters in diameter and three meters deep. There are "reservoirs" or depressions here and there. The smaller ones may have been Kivas, and their exploration is suggested.

THE KALFUS RUINS.

This group is three miles due west from Phoenix and perhaps three miles north of the Salt River. It belongs to the series lying on both banks of the stream and extending east and west for some 25 miles. It consists of ruined adobe walls and accumulated debris.

The two larger buildings, called temples by Mr. Garlick, who worked some years with Mr. F. H. Cushing, occupy a central position, and are both surrounded by an adobe wall three meters wide and averaging half a meter high. To the south, this wall forms a sort of platform extension of the south or highest temple.

The one to the north is east and west fifty meters; north and south, seventy-eight meters. Archaeologists might differ as to where the "wash" or accumulation at the base end and the natural surface begins. Hence, these measurements might be a meter more or less upon each side and end. The writer would suppose that the original building was something like 35 x 60 meters.

The wall measures: west side (north and south), 160 meters; north side (east and west), 80 meters.

To the east, lying between it and a smaller ruin, is a low place, evidently a reservoir, also from whence earth was taken for the adobes. To the west is a similar depression. Above these low places the ruin stands four and one-half meters. From the level, the height is about thirty-three meters, but the ends are lower by one-half or two-thirds m. than the central positions.

During the course of exploration we uncovered seven skeletons in various stages of preservation. The sides of the graves were smooth, of plastered adobe. One adult to the west had a child with it in the same grave. The little one was rather doubled across the adult. It is interesting to observe that three of the bodies headed east and two west. The last skeleton exhumed (see fig. 26) had a whole pot near the head and a fragment of large olla in which were portions of a cremated skeleton

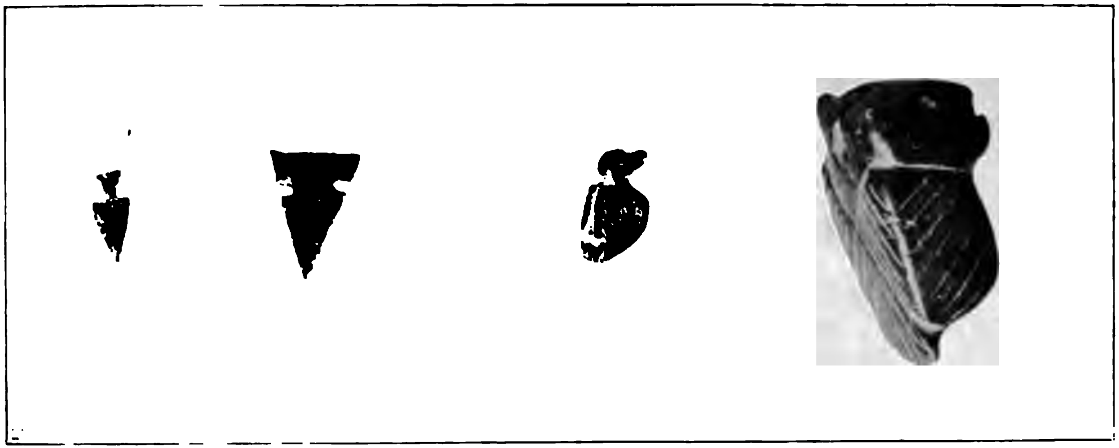

FIG. 46 — TWO FINELY WORKED EFFIGIES IN BLACK ONYX AND TWO MINUTE ARROW POINTS OF OBSIDIAN From the large ruin near Mesa, Arizona S. 1-1

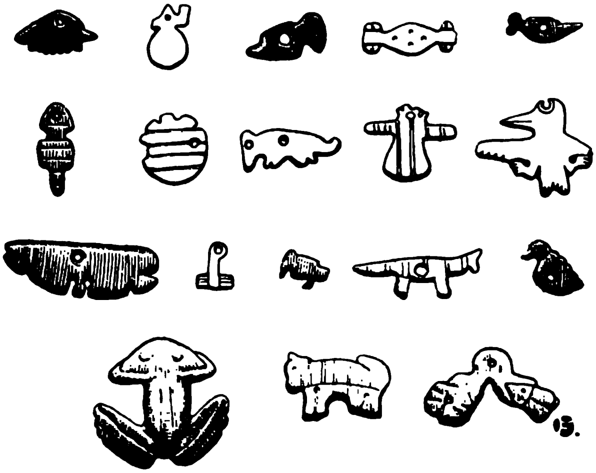

Fig. 47 — GROUP OF VARIOUS SHELL EFFIGIES

From the Salado valley ruins S. 5-9

In a room, the floor of which was as hard as if it had been burned, we found a fine slate tablet, seven axes, three metates, two mortars, and other things. The room floor was two and one-half by four meters in extent.

When the main trench was down about three meters we observed numerous pottery fragments, ashes, charcoal, and broken bones. These were in little pockets or ash pits, ranging from half a bushel to as much as three or four bushels. One large ash-pit was three feet in depth. No floors could be traced and no walls found in the central cut save at the ends. We cleaned out the central cut to the original base, exposing six meters by 19 meters, and found little or nothing. It was even difficult to find the original base. No general floor seemed to have existed, and we abandoned the central part of the cut completely mystified as to the purpose of the ruin at this point.

The west trench showed several small rooms. The walls of these were about 40 to 50 cm. thick and fairly regular. Some few axes, metates, and other objects were found near the surface of the trench, but nothing further down or upon the original surface save the usual charcoal and ashes and pottery fragments. In fact, nearly all the objects occurred near the surface of the mound. We put the team and scraper to work and scraped off a foot from portions of the structure not yet examined, finding, during this operation, some axes, grinding stones, metates, chips of obsidian, and broken ollas. Of the latter several were saved, and though in a fragmentary condition it is quite probable that they can be restored.

After completing work upon the large ruin, we examined a number of small ones of the same group.

In these were found no walls save in the case of one. There was a well defined room, the floor being a meter below the present surface. A metate and grinder and an axe, also a broken olla were found upon the floor. The other ruins seemed to be more the nature of mounds resulting from long living upon one spot, or due to the accumulation of debris, The pottery in and on them was largely plain, although decorated varieties were not wanting.

Regarding the north temple the writer would say that it does not present any regularities such as Cushing found at Los

Muertos, but on the contrary seems to be a collection of small rooms built upon an original kitchen-midden at various times. The writer opines that no restoration of a complete series of rooms surrounding a common court can be constructed for the simple reason that no such regularity of construction ever existed.

The rooms to the north and west and east seem to be small, with one or two exceptions, and to extend down not more than two meters in any case, and usually about one meter.

The higher temple to the south may present more interesting structure, but it was thought best not to attempt its exploration.

Save at the Kalfus mines and one other, no cremations were discovered while the writer was in the Salado country. In a small ruin near Mesa several basin-shaped plain bowls were dug out of the corner of a room, and in one of them was about a quart of calcined human bones. Often large ollas are dug up, and they invariably contain burnt bones.

The adobe ruins of the Salado offer a rich field for archaeologists. Particularly does the great ruin at Mesa appeal to the explorer. And near Los Muertos, where Cushing worked so long and faithfully, are other sites that should be examined.

It is to be hoped that the region will not long be the prey of the curio hunters and the irresponsible collectors.

South of Phoenix, some six miles, are remarkable pictographs upon the rocks and cliffs of the bluffs bordering the Salado river. They number a hundred or more, and may, for aught the writer knows, extend for some distance in either direction. Several of the best ones are shown in figs. 48, 49 and 50. The originals are twenty to thirty times the size of the illustrations.

Two pottery bowls were found south of Phoenix, that are unusual in that they contain much flower gold. The natives must have found gold-bearing clay, and, with no idea of the value, made it into pottery. As they would naturally take the surface clay, probably larger nuggets could be found deeper down. The pottery was shown in Phoenix in 1898 and created some excitement, but those who searched were not rewarded for their pains. Possibly the pottery came from considerable distance. Certainly the clay out of which it was made was not found near the ruin.

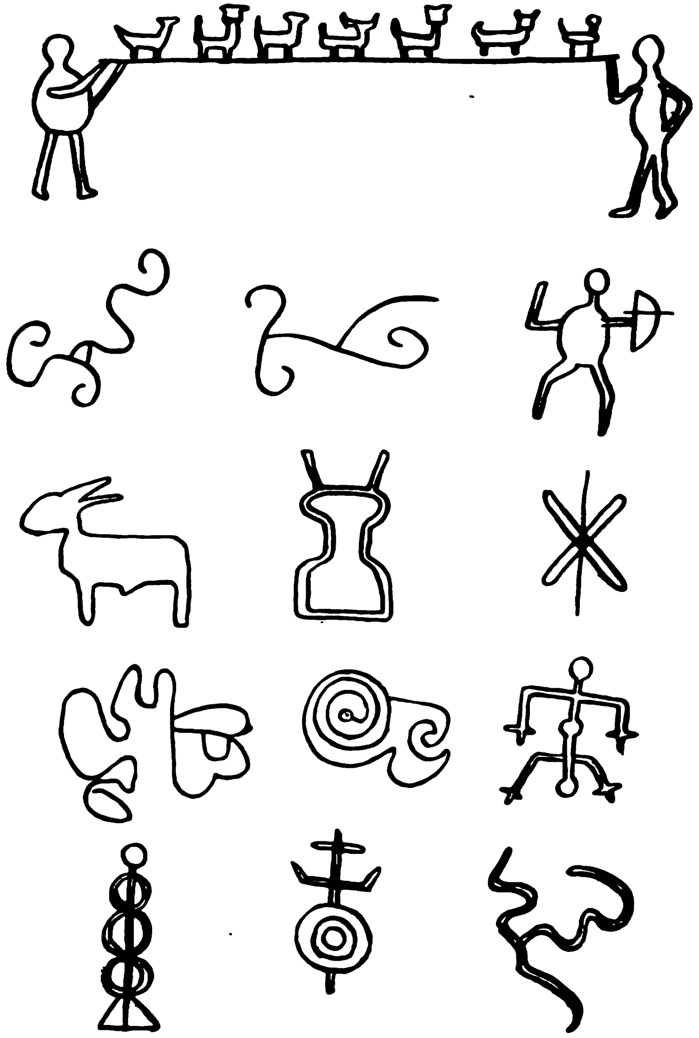

Fig. 48 — PICTOGRAPHS

From Bluffs south of Phoenix S. 1–20

The illustrations (45, 46, and 51) give a fair representation of the small effigies numerous about the adobe ruins of Arizona. These are characteristic of the region, and their counterpart is not found anywhere in the United States. In the collection are numerous shells, exhibiting different stages of workmanship. In some the crown has been broken off; in others the grinding has begun, and step by step the process can be traced to the completed shell bracelet. There are finished and unfinished shell frogs, little shell discs and small ornaments with wing-like projections on either side. From these to the effigy proper is but a step. The finer shell effigies, illustrated by fig. 47, exhibit action, and are exceedingly well made.

Transportations of these shells from the Gulf of California across the American desert must have induced hardships and privations. If the natives came up the Colorado river and then followed the Salado to the Phoenix ruins, their route would have been longer but undoubtedly easier. They were assured of a water supply.

As to the number of similar effigies found by Cushing in his work at Los Muertos, the writer is not informed. It will be observed that fig. 51 is a half tone plate of four effigies shown in fig. 47, which is reduced from a drawing. The onyx bead in fig. 51 does not appear in fig 47. It was the writer's wish to present photographs as well as drawings of these remarkable specimens. The half tone plate (fig. 51) is full size and the drawings about five-ninths size. In fig. 46 the two effigies and the two arrow points are shown full size.

Most of these effigies are perforated. The shell frog is not. Neither is the small owl (?) effigy shown above the frog in fig. 51. All of these are exceedingly well executed. The lower right hand figure in 47 appears to have been the head of an aquatic bird. Originally it may have formed a part of an entire effigy, as there are traces of break extending across the neck. Careful grinding has almost obliterated these evidences.

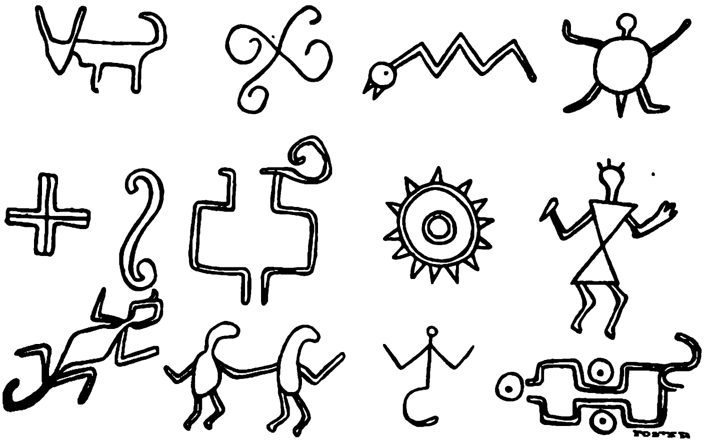

Fig. 49 — PICTOGRAPHS

From Bluffs south of Phoenix S. 1–20

COLLECTING AT FLINT RIDGE.

Mr. Peabody was greatly interested in Flint Ridge, particularly so as his home was within fifteen miles of the eastern extension of the quarries. In the summer of 1899 he wished that the writer would send Anderson on a collecting trip to Flint Ridge. Anderson spent about three months and obtained an exhibit totaling over five thousand objects. There was also another reason — and this is indicative of Mr. Peabody's kind heart. Anderson had contracted malaria in the south, and Mr. Peabody thought that a season's residence on the high ground of eastern Licking county would "drive all the malaria out of his system." He was entirely correct in his opinion. Mr. Gerard Fowke, in the interest of the Smithsonian Institution, made a study and exploration of the place over twenty years ago. His observations and explorations are detailed in the "Smithsonian Report" for 1884.

Mr. Fowke prepared a more condensed account of the remarkable place for one of the writer's earlier works.* The book is now out of print, and as Mr. Fowke's paper is important, and worthy of preservation, it is incorporated in this BULLETIN as an appendix.

The obsidian quarries of the west, or the mica mines of North Carolina, or the nodular flint deposits in Tennessee, or the jaspar quarries of Pennsylvania — none of these exerted as much influence upon the aborigines as did Flint Ridge. Possibly, if the copper found in the mounds came from a limited area from either Wisconsin or Michigan, such a site may have been deemed more important in the eyes of the barbarians, as copper was naturally more mysterious than flint. But granting that the copper comes from a widely distributed area, the writer is of the opinion that Flint Ridge furnished more material for aboriginal usages than did any given area in the United States. Arrows and knives made of its multi-colored chalcedony and chert are found in western New York and far down the Missisippi. Throughout the Ohio Valley no one may know what

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* *Primitive Man in Ohio*, p. 30.

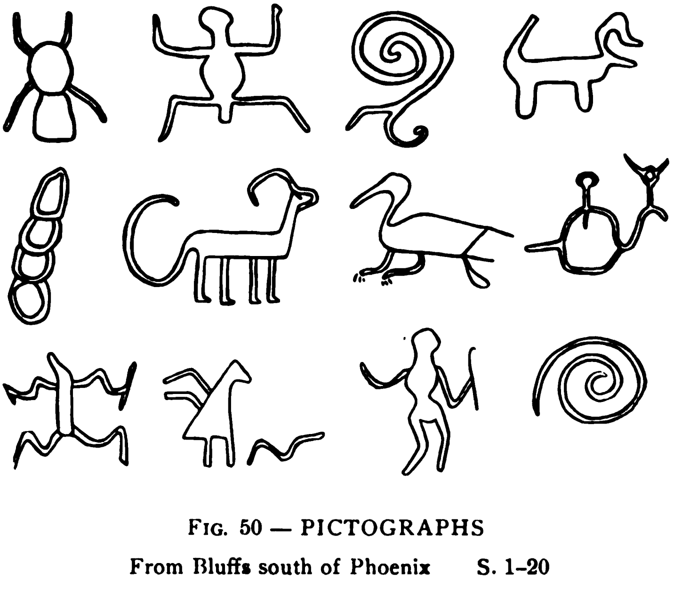

FIG. 50 — PICTOGRAPHS

From Bluffs south of Phoenix S. 1-20

numbers of chipped implements were made of its stone. Some of the mounds contain chipped objects of this material; others do not. It is found on some sites, on others it does not occur. Such facts are of great archaeologic importance, and relate to the antiquity of the workings on the Ridge. No reference to Flint Ridge and its pits can be found among the earliest travelers and explorers. James Smith, the famous captive, in his well known narrative, does not allude to it. Smith was in Ohio shortly after Braddock's defeat, and there were few white men in the entire region. Explorations indicate that there has been no quarrying at Flint Ridge in the last four or five centuries. Speculation upon the age of the pits judged by timber growth is not satisfactory. Yet the earliest settlers noted large trees growing in pits and upon the fields where unfinished objects are most numerous.

In the four illustrations presented (figs. 76–7–8–9), a few characteristic Flint Ridge implements are to be seen. Contrary to some quarry sites the material at Flint Ridge is found to be both finished and unfinished. Numbers of the natives carried away discs, turtle-backs, and thick blades, and did the final work at their homes. Others stopped within five, ten, or twenty miles of the Ridge and there completed their weapons and tools. This observation is quite true, for there are scores of workshop sites on the hills and in the valleys north, south, east and west from the main deposits of Flint Ridge.

Whether Flint Ridge was sacred ground, as was the Catlinite quarry in Minnesota, is an open question. The presence of earth and stone fortifications about the Ridge and in the vicinity would indicate that the Ridge was not neutral ground. Yet such observation is more or less speculative, because these works may have been built at a subsequent period when the quarries were not worked.

About the main pits themselves agriculture is impossible. In some fields spalls, chips, cores, etc., are more numerous than earth itself. Dr. Wilson from one spot took out a section three or four feet in depth of which upwards of one-third consisted of fragments or chippings, the work of man. It has been suggested in the past, and the writer wishes again to call attention to the suggestion, that some museum make an exhaustive survey of the Ridge, mark all of the pits, and explore as many of them as practicable.

In prehistoric times Flint Ridge was more necessary to the life of the barbarians than any other site or earthwork in the entire Ohio valley. Its preservation to future generations should be assured by purchase, through the medium of some society or other organization.

Flint Ridge has not suffered as have the mounds and graves of the Mississippi valley or the cliff houses and adobe ruins in the west, because collectors of fantastic objects, who are responsible for the destruction of other monuments, found little of interest in the workshops and pits of Flint Ridge. Although some tens of thousands of specimens are to be found in museums and the hands of private collectors, Flint Ridge remains practically intact. It is truly one of the wonders of aboriginal life in America. It is so extensive that no survey could hope to make thorough examination short of two years, but such an exploration might reveal to the archaeologic world many things as yet unknown.

Typical flint discs and turtlebacks are shown in fig. 76. There are two hammerstones in the lower left hand corner. The specimens shown are all one-fourth size. The largest specimen is a rough block of flint, practically as quarried. A half-dozen blows have been struck on either side. The others represent more or less early stage work, although all of them are more finished than the one just mentioned.

The leaf-shaped and unfinished implements in fig. 77 represent the stage where the hammerstone is exchanged for the flaker.

Fig. 78 are blades practically complete, which may be employed as knives without further work. As spear-heads they must be pointed and barbed. Both varieties are shown in this illustration.

Fig. 79 gives a fairly correct representation of the famous cores of Flint Ridge. These are seen in the two lower rows. Several of these are cone-shaped. They occur by countless thousands at Flint Ridge and are evenly grooved. From these flake knives were detached. Flint knives were quite sharp and doubtless served as cutting instruments, razors, etc. Eight of these are shown in the upper rows.

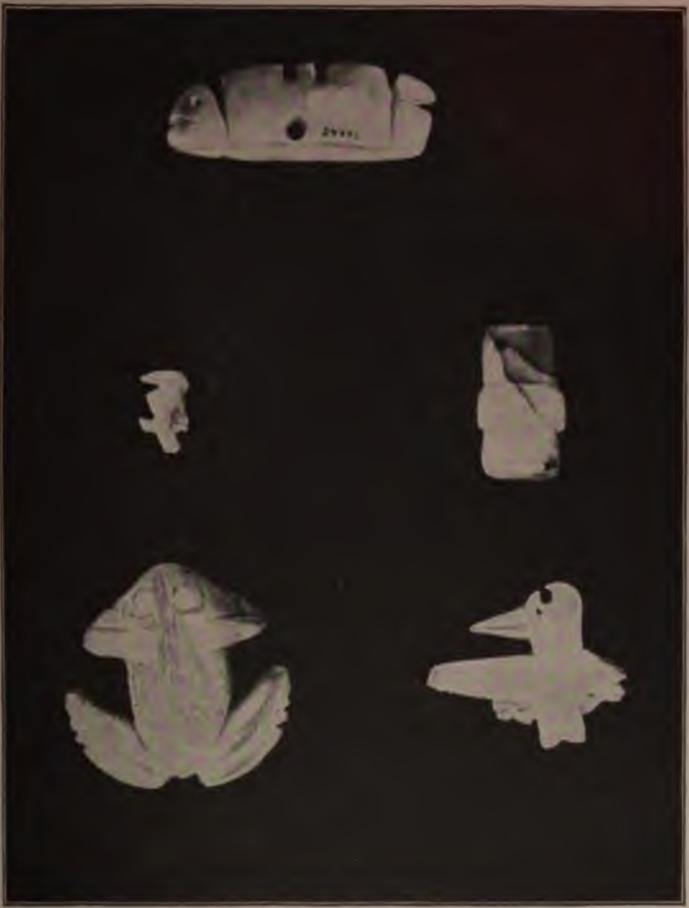

Fig. 51 — SHELL FROG, TWO SHELL EFFIGIES, ONYX BEAD AND EFFIGY FISH (jade?)

From the large ruin near Mesa S. 1-1

UNIV. OF MICH.

It is of importance to archaeologists to know that Professor William C. Mills, Curator of the Ohio State Archaeological and Historical Society, Columbus, has examined Flint Ridge and other materials. By the following appended report, made by Mr. Mills to the writer, will be observed that it is possible to distinguish the material of doubtful specimens by microscopic analysis.

THE OHIO STATE
ARCHAEOLOGICAL AND HISTORICAL SOCIETY.

COLUMBUS, OHIO, October 30, 1906.

DEAR MR. MOOREHEAD: —

Your letter of the 26th received and contents noted.

For a number of years I have been studying the flints of Ohio by making microscopical sections, and of the flints I secured one hundred and ten good slides. These slides show that the Flint Ridge material is a very fine grained variety containing but little iron or other foreign substances, and under the microscope it shows a fine grained aggregate of chalcedonic particles. The structure is crypto crystalline and so fine that the optical properties of the individual particles cannot be determined. In other sections we find that throughout this crypto crystalline base or ground mass are scattered numerous colorless polarized particles of chalcedonic material in a coarser condition; while in other segregations areas of the same material showing fan shaped arrangements of the particles and on the majority of the slides made show small areas of granular quartz; while in many of the slides the remains of foraminifera are quite abundant. Up to the present time I have worked out upwards of twenty-five species of foraminifera.

Very truly yours,
WM. C. MILLS.

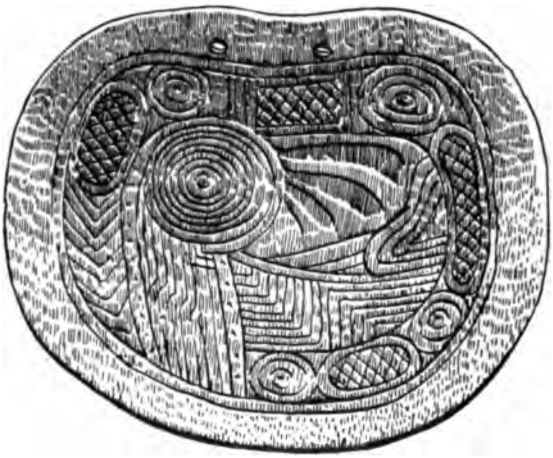

FIG. 52 — ENGRAVED SHELL

Tennessee S. about 1-2

EXPLORATIONS AT HOPKINSVILLE, KENTUCKY.

In January, 1903, the Department received several communications from Miss Mollie Hall of Hopkinsville, Kentucky, regarding Indian cemeteries located upon the farm of Mr. James Willis, about four miles south of the town. Early in April the Curator visited Hopkinsville, and spent some two weeks in an exploration of the graves on Mr. Willis' land. Mr. Willis kindly consented to a thorough exploration. Mr. Charles Anderson, a local photographer, was engaged, and seven or eight negroes were employed for manual labor. A total of 103 graves were opened and 100 negatives were taken. Mr. Anderson kindly secured permission for exploration of other sites after the work had been completed at Hopkinsville.

We divided the field into lower and upper sections. These are about one hundred and twenty meters apart. There may be graves between both, but this cannot be determined without more extensive digging than we could do. The force of laborers dug twenty or thirty holes daily and examined, quite thoroughly, some two acres of land.

These graves range in depth from one-third to one meter, and were scattered throughout some fifty acres of land. It is quite probable that all of the graves were not found and opened by our party. The average grave is one meter and four decimeters in length, three to five decimeters in width.

Three graves close together covered three and two-tenths meters in extent. Our total digging covered an extent of forty-seven meters in both upper and lower cemeteries.

A certain wide grave contained three bodies, one being north and south and the others east and west. But such an interment was out of the ordinary, none just like it was found here or elsewhere. An unfinished stone celt was found in one grave.

Several hundred yards to the east of the field is a deep depression in which is a large spring. The level of the spring must be twelve or thirteen meters below the average level of the graves. The spring has a strong, steady flow, and is characteristic of similar underground springs found in Kentucky, Tennessee, and Missouri. It bubbles up abruptly at the north end of the depression, flows along tranquilly for some one hundred meters, and then sinks into the ground again. The entire depression is oval in shape, and the banks are as abrupt at the outlet as at the fountain head. The presence of this spring may have induced the natives to locate their village and burial ground on the surrounding land above.

The graves were of the character common to southern Kentucky and northern and central Tennessee. Stones were placed upon edge on either side of the body, and a large, single, thin slab at the head and at the feet. The floor of each grave was lined with thin slabs, as was also the top. In other words, the material for each grave was taken from adjacent creek beds, wherein slabs of the Cincinnati and Niagara groups of limestone formation abound. These streams were quite convenient for the natives, and all they had to do was to visit them, perhaps do a small amount of quarrying, select such slabs as suited their purposes, and carry them to the elevation above — a distance of about three hundred and fifty meters — and inter the dead, using these stones as walls for the graves.

The neatness of some of the graves was noticeable, while in others, more or less carelessness of construction was displayed.

Of relics and utensils there were few, most of the interments consisting solely of the body. Usually the subject was placed upon the back, the hands extended at the sides, the legs straight, and the whole subject in such a position as to indicate that he was buried with the flesh on the bones. In certain instances the burial appeared to be made after the bones were denuded of flesh. Occasionally, we found two or three bodies in a grave. In such cases the grave itself did not vary from the ordinary, save in the number of interments, but the peculiarity was marked in that the bones were in confusion, or, if not in confusion, the two or three crania were placed together, and the longer bones, the femur, humerus, tibiæ, etc., were heaped by themselves. As a theoretical consideration, it might be said that these represented bodies of persons slain in battle, or that the bodies were preserved by the tribe making these burials until the flesh had decayed from the bones. Certain it is that

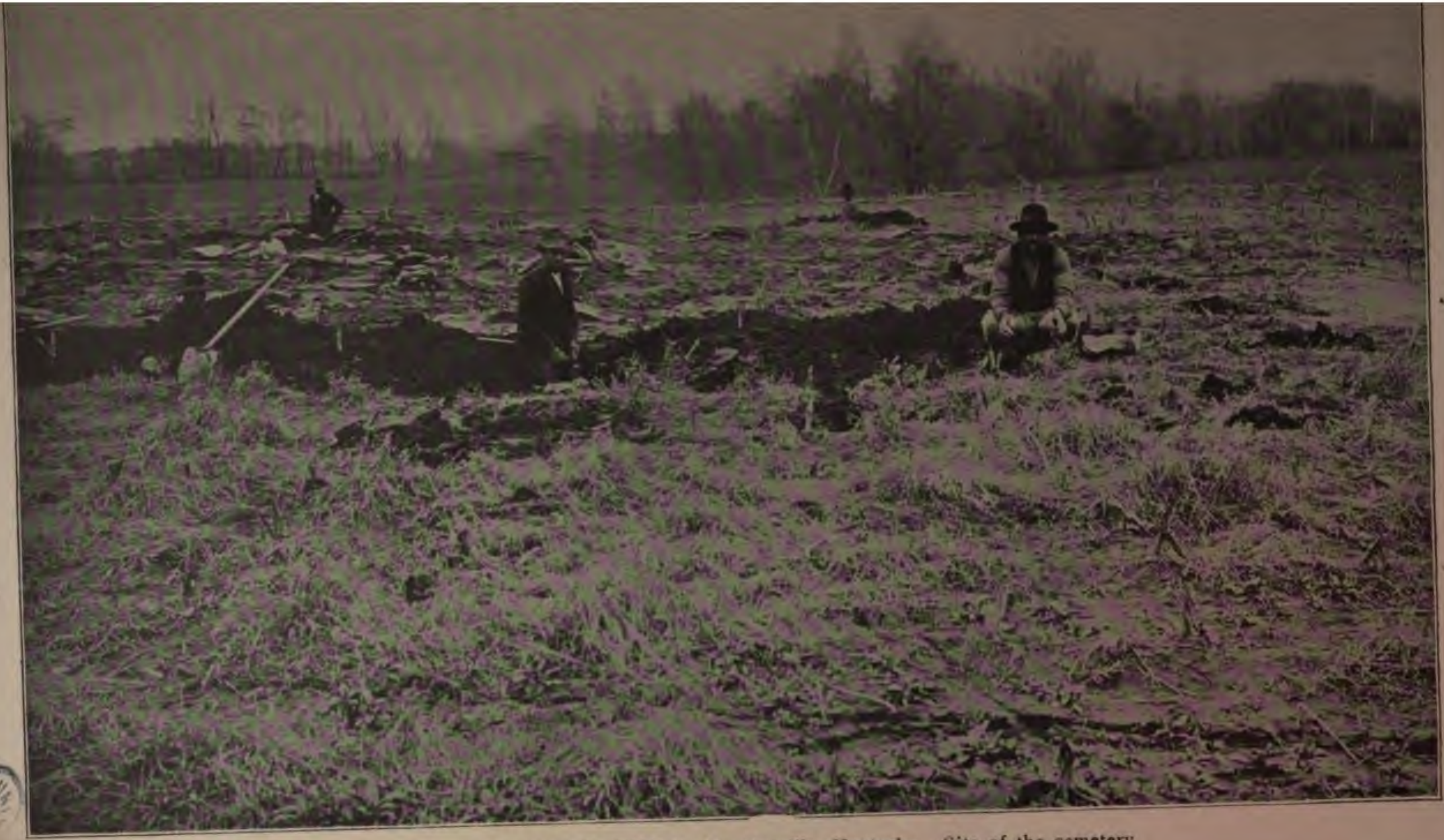

FIG. 53 — THE WILLIS FIELD, Hopkinsville, Kentucky. Site of the cemetery

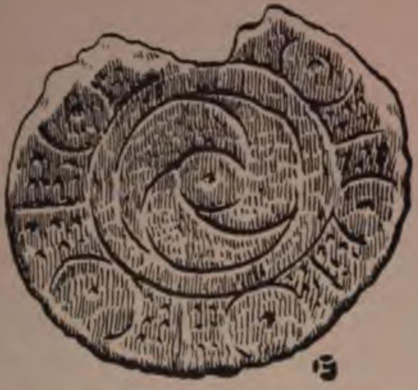

FIG. 54 — ENGRAVED SHELL
From a grave on the Willis farm S. 1-1

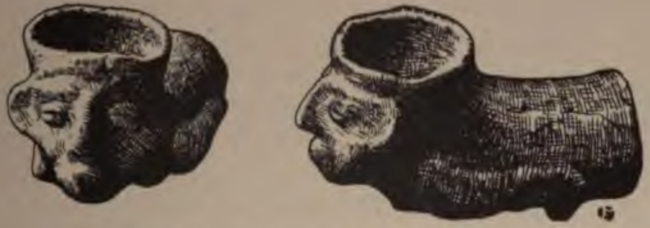

FIG. 55 — HUMAN EFFIGY PIPE
From a grave in the Willis cemetery, Hopkinsville, Kentucky S. about 2-3

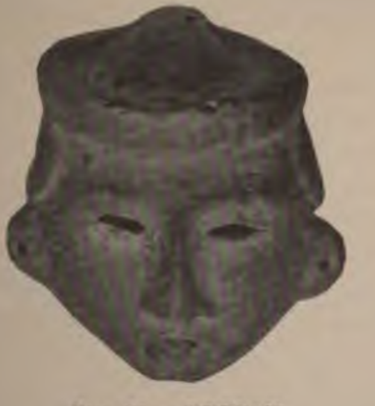

FIG. 56 — EFFIGY
From a mound near South Carrollton, Kentucky S. 1-1

the bodies of persons recently deceased could scarcely be put into so small a space, such as is apparent in some of the graves.

We found graves two decimeters in width and one meter in length, and less than two decimeters in depth, which contained from two to three burials. Therefore, it is apparent, that numbers of deceased persons must have been kept in a charnel house for some time.

Considered in its entirety, Mr. Willis' cemetery presents several problems for the consideration of the archaeologist. Although the graves in construction are similar to those of southern Kentucky, northern and central Tennessee, yet, in the absence of clay vessels and large flint implements, and in the almost total lack of ornaments of shell or bone, they are different from those farther south. Flint chippings and broken pottery were quite frequent upon the surface, but few of these were found in the graves. Whether this indicates a different tribe from the true stone-grave people of Tennessee, or whether it marks a division of that tribe, is a question for future solution. The culture is quite inferior to that evinced by the Nashville graves and those of other regions.

Several graves were quite different from anything we had found hereabouts or in other (northern) portions of the country. In six or seven graves, placed near together, the skeletons were headed the same way, south, except the skeleton of a child, which was headed north. The preservation of the bones is the same as in other cases. This may be due to the peculiar condition of the soil, or it may be due to the fact that the interments were post-Columbian, which the writer doubts. On the field evidence, it seems that these interments are prehistoric, and not of the last three or four hundred years. If this statement is wrong, the writer stands corrected. The bones have been buried so long that every bone of the body is of the same color as the soil surrounding it. It was, therefore, necessary to whiten [illegible] pulverized chalk each skeleton in order to bring out [illegible] into relief, otherwise there would be no contrast [illegible] skeleton and the surrounding earth. The graves [illegible] been placed in no regularity as regards the points [illegible]—that is, some of the bodies show the head east, [illegible] others southwest, others northwest, etc., therefore

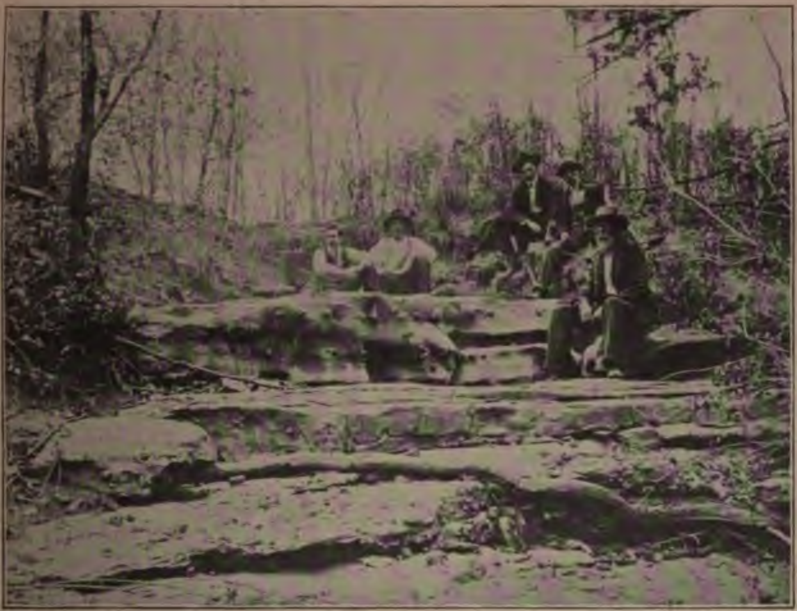

FIG. 57 — RAVINE AT JOHNSON'S FARM

Near Herndon, Tennessee. The nodules are seen outcropping in two layers

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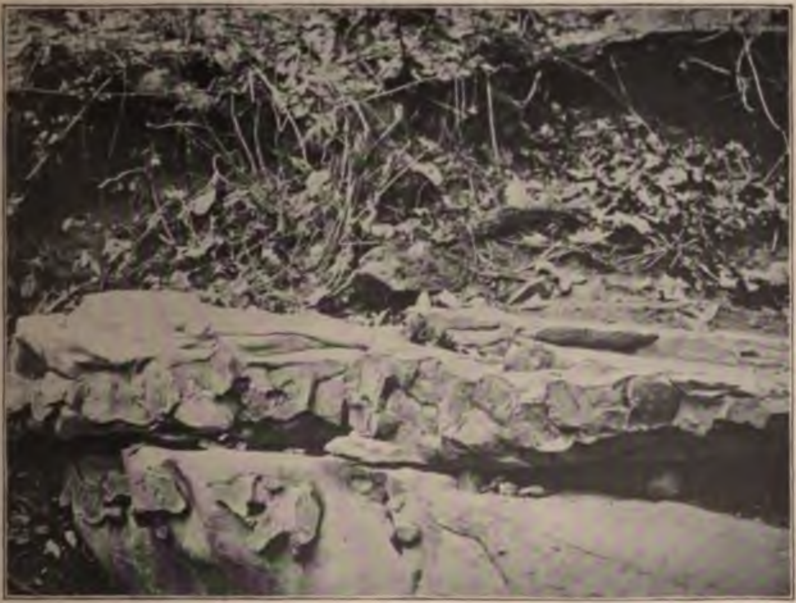

FIG. 58 — A CLOSER VIEW OF THE NODULES IN POSITION

Ravine on the Johnson farm near Herndon, Tennessee

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no hard and fast rule can be established as to the burial of the bodies either in this direction or that direction, and the evidence is that these bodies were simply interred in stone graves, as previously mentioned.

Fig. 55 is an effigy pipe from one of the graves at Hopkinsville, Kentucky. Fig. 56, a little effigy head from a mound near So. Carrollton, Kentucky. Both of these are from prehistoric burials. The effigies are remarkable in that the features are strongly southern, of that peculiar type which will at once be recognized by a study of the illustrations in General Thruston's book; certain of the human effigies found by Messrs. Squier and Davis are also identical with these. Mr. Mills found an idol pipe in the Adena mound, Chillicothe, Ohio. This pipe has the same peculiar features noted in the others. These various effigies may be taken to be likenesses of the people that built the mounds of the Mississippi valley. It will be observed by comparisons in museums that such Iroquois faces as are portrayed by means of effigies are quite different from the type represented in the Ohio, Tennessee, Hopkinsville, and So. Carrollton or Scioto finds.

A FLINT QUARRY IN TENNESSEE.

Having ended explorations on the Willis estate, Mr. Anderson and the writer engaged a large barge and with our negro laborers visited several sites in Tennessee. We examined village sites that had been favorably reported to us, and also some cemeteries, but all of these had been more or less disturbed; therefore, we concentrated our efforts upon the flint quarry on Mr. George Johnson's farm, six miles over the Tennessee line in Montgomery Co., and about eighteen miles from Hopkinsville.

Village sites in the neighborhood contained a great deal of nodular flint. From a study of these the writer apprehended that the parent ledge must be somewhere near at hand. Inquiry confirmed this opinion, and we were soon at work on the original site. Figs. 57 and 58 show one of the ravines and flint nodules in situ. Several bushels of material in various stages of manufacture were found by our men on the surface in the course of one day's examination.

This was a very important discovery, as nodular flint had not been previously found in Tennessee in any considerable quantities, so far as the writer is aware. Mr. Johnson kindly permitted excavation, and on the edge of the bluff, toward Little River, we found that the chips, spalls, and refuse extended to a depth of one meter or more. This is distant about three meters from the edge of the ravine, near its head. Other points near this one revealed the fact that the flint deposit varied from one-fourth to two meters in depth. The ravine itself deepened and widened as it came nearer to the river, and at the mouth we found a ledge of limestone — rather soft limestone — in layers or shelves from one-half to two meters in thickness. From the top of the outcrop of the limestone to the surface of the water, at a distance of five or six meters, flint nodules occurred frequently, and there is abundant evidence that the natives worked both the ravine and the land on either side. All over Mr. Johnson's farm, to the extent of at least fifty acres, are great quantities of chips, spalls, leaf-shaped implements, hammerstones, etc.

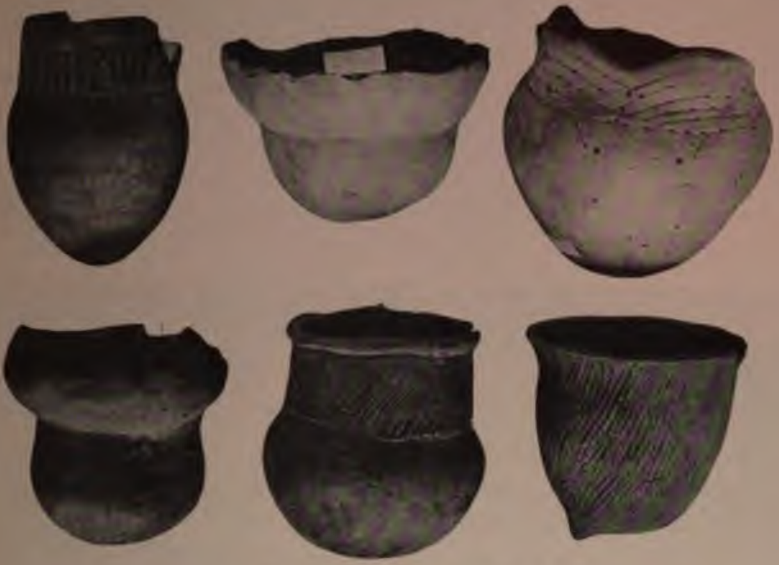

Fig. 59 — POTTERY S. 1-4

Presented by Mr. Clarence B. Moore to the Department, and taken by him from mounds in Florida during his explorations.

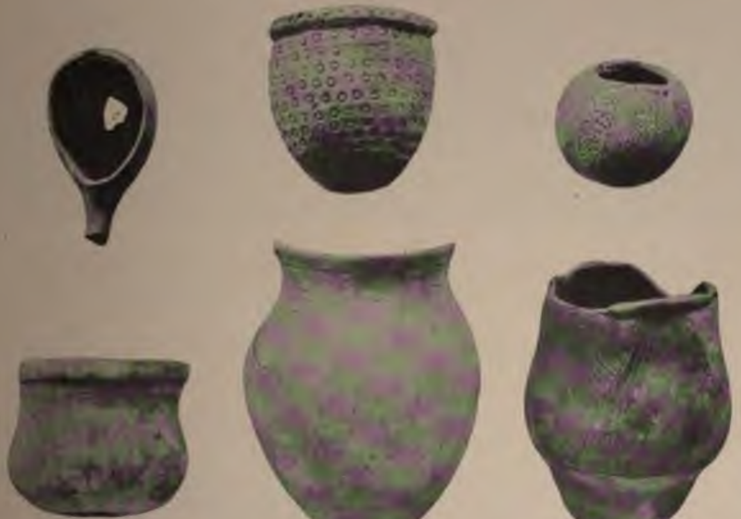

Fig. 60 — FLORIDA POTTERY S. 1-4

Presented by Mr. Clarence B. Moore and taken from Florida mounds by him

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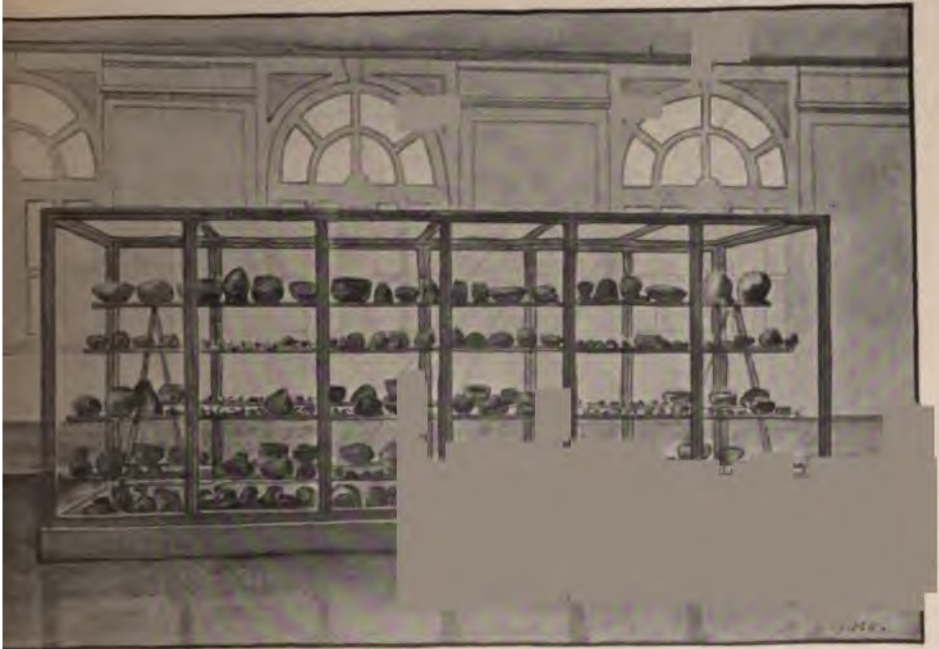

FIG. 61 — CASE CONTAINING MR. CLARENCE B. MOORE'S FLORIDA COLLECTION S. I–88

This case is 7 meters long.

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About five miles from Herndon, and just over the line in Tennessee, is a high bluff overlooking a tributary to Little River. On this bluff an immense amount of chipping has been done, both from the nodular flint and from a brown or yellow chert, which occurs somewhere in the neighborhood. At this point material sufficient to fill a soap-box was picked up in two hours' search. The material is of the same general character as that found on the Johnson farm, six miles distant.

In the "American Anthropologist" for July–September, '06, there is a comprehensive article of more than 130 pages entitled "Progress of Anthropology". This article states (p. 534) that Mr. Fowke and other searchers have been unable to find any large quarry from which the gray or bluish nodular flint was obtained. That is, flint in particular of the same character as the Hopewell discs. An examination of the Montgomery county deposit will reveal the same kind of material as that found in the Hopewell mound. And in the exhibit at Andover are a number of discs of the same workmanship as the ones from Hopewell's. The writer suggests that as the Cumberland river is not far from Mr. Johnson's farm, that discs might have been carried thither, then put in canoes and transported by water to a point on the Scioto opposite the Hopewell village. Small deposits of that material occur frequently, but no great quarry such as would account for the presence of countless numbers of knives, scrapers, and projectile points scattered throughout the upper Mississippi valley from Illinois to central Ohio and from northern Indiana to Knoxville, Tennessee. The writer does not claim that the quarry site on the Johnson farm furnished all this material. Indeed, the quarry is not of sufficient magnitude, but it is quite apparent that a great deal of work has been done in prehistoric times on the Johnson estate. The nodules vary from ten to twenty cm. in diameter, with a coating of grayish chalk-like formation on the exterior, and within are of the same color and appearance as the Hopewell discs.

Continued searching in the Clarksville region (northwestern Tennessee) may result in the discovery of much larger deposits. The writer would suggest a careful search of Little river and its tributaries, not only near the Johnson farm, but in the vicinity of Herndon. Probably where the ravines are deeper, greater deposits will be found. In view of the scarcity of nodular flint deposits, the writer considers the discovery one of very great importance.

Monday, Tuesday, and Wednesday the entire force drove a distance of sixty-five miles and visited a dozen farms. These had been recommended to us by various persons who came to the scene of the exploration on Mr. Willis' farm, and kindly offered information regarding sites near the Cumberland river and elsewhere. Most of these grave groups had been disturbed to no little extent, but several were located which are promising, and might result in some discovery if an exploration were begun. But as it was necessary to explore Jacobs Cavern, some five hundred miles west of the Hopkinsville region, and as only six weeks remained for that purpose, the writer was compelled to defer further digging and, after shipping the specimens and skeletons to Andover, proceeded to Bentonville, Arkansas.

The Cumberland-Tennessee region, of which Hopkinsville is a part, merits thorough exploration. It is exceedingly rich in art in shell, and up the Tennessee and Cumberland are numerous cemeteries in Central Tennessee. In recent years some of the largest flint implements ever found in the world were exhumed from several of these graves, and are now in the Missouri Historical collection at St. Louis. A number of commercial collectors are traversing the region or voyaging along the Ohio, Tennessee, and Cumberland rivers in houseboats. These men cause the destruction of a large number of monuments, and museum men should take the field before further damage is done.

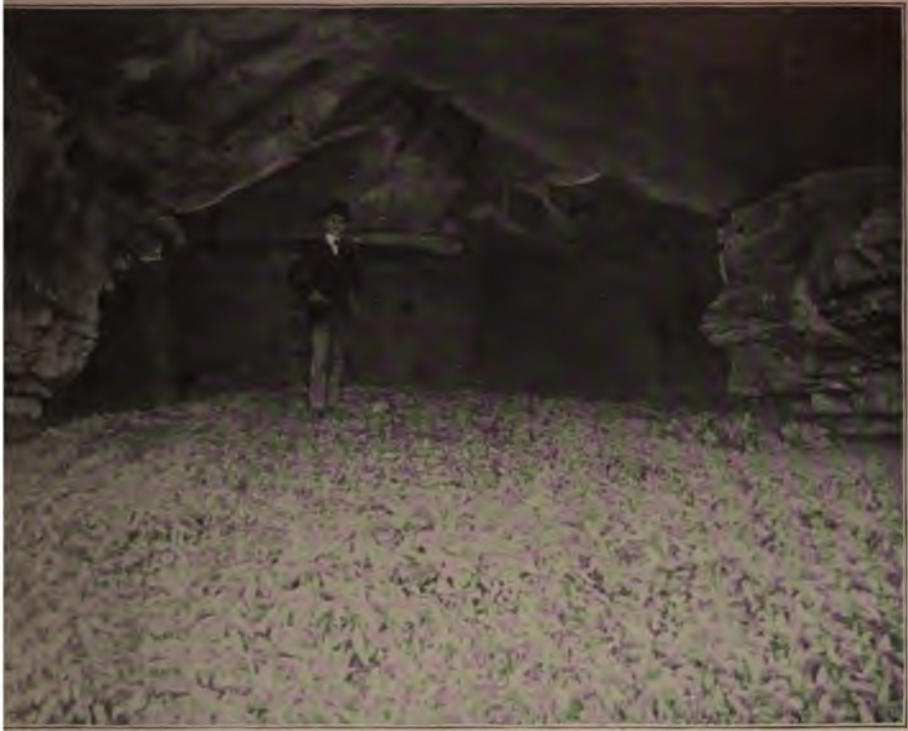

FIG. 62 — McELHANEY'S CAVERN

Arkansas

Described in BULLETIN I, The Exploration of Jacobs Cavern, McDonald County, Missouri. Department of Archaeology, Phillips Academy, Andover, Massachusetts. C. Peabody and W. K. Moorehead. 1904.

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CERTAIN UNKNOWN STONE OBJECTS IN THE ANDOVER MUSEUM.

At a meeting of the American Anthropological Association, held in San Francisco during August, 1905, a paper was read by the Director of this Department, in which he and the Curator urged that an archaeologic nomenclature be invented. A committee was formed consisting of Dr. Hodge, Professor Wright, Mr. McGuire, Dr. Peabody and the writer, Dr. Peabody being chairman.

That we need an archaeologic nomenclature no one will deny. Particularly is this emphasized when one views the multitudinous stone artifacts and unknown objects which fill the cases in our museums. Some of these by their shape testify as to the purpose for which they were made. Others are of fantastic and unusual forms, are wrought from shales, granites, or quarztes, and because our ancestors made use of nothing like them we cannot conceive by comparison (or *lack* of comparison, rather) aright concerning them. For years they have remained an enigma.

The light of history fails to aid us. Such specimens as are here illustrated have not been found elsewhere in the world. Earliest explorers and travelers in America allude occasionally to stone pendants worn by the natives, but do not specify what kind. A student cannot determine from these early narratives whether a small slate ornament, a large winged-perforated object, or yet another form is meant. The historical references are vague; they do not help us. So far as the writer's reading extends, none of them assist in solving the problem. If there are references that clearly define the use of winged-perforated stones, and the writer has overlooked them, then he stands corrected. Manifestly, we must depend on the field testimony and follow the natural history method in treating of the specimens themselves.

Archaeologists, for the most part, are silent on the subject. Holmes, Rau, Beauchamp, Fowke, and others make brief remarks. Cushing had prepared a paper on such forms as are

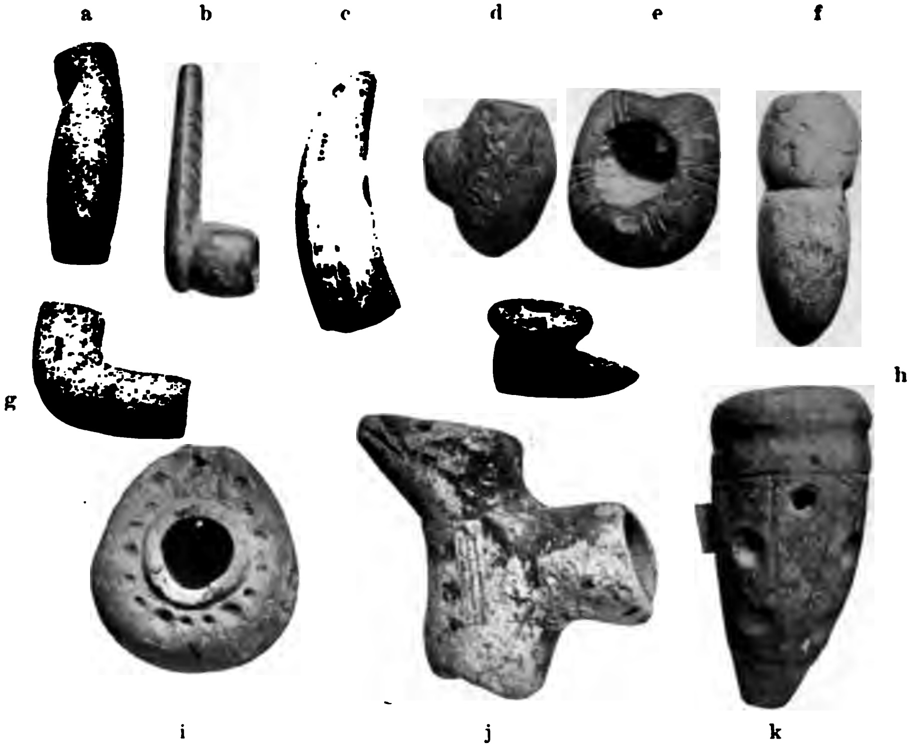

FIG. 63 — GROUP OF PIPES

From various localities in the Mississippi valley

a—Scioto Co., Ohio.
b—Ross Co., Ohio.
c—Pipe made from a whale's tooth. Alaska.
d—Scioto Co., Ohio.
e—Miami Co., Ohio.
f—Scioto Co., Ohio.
g—Scioto. Co., Ohio.
h—Wabash cemetery, Indiana.
i—Hancock Co., Ohio.
j—Silver Creek, Morgantown. N. C.
k—Grovetown, Georgia.

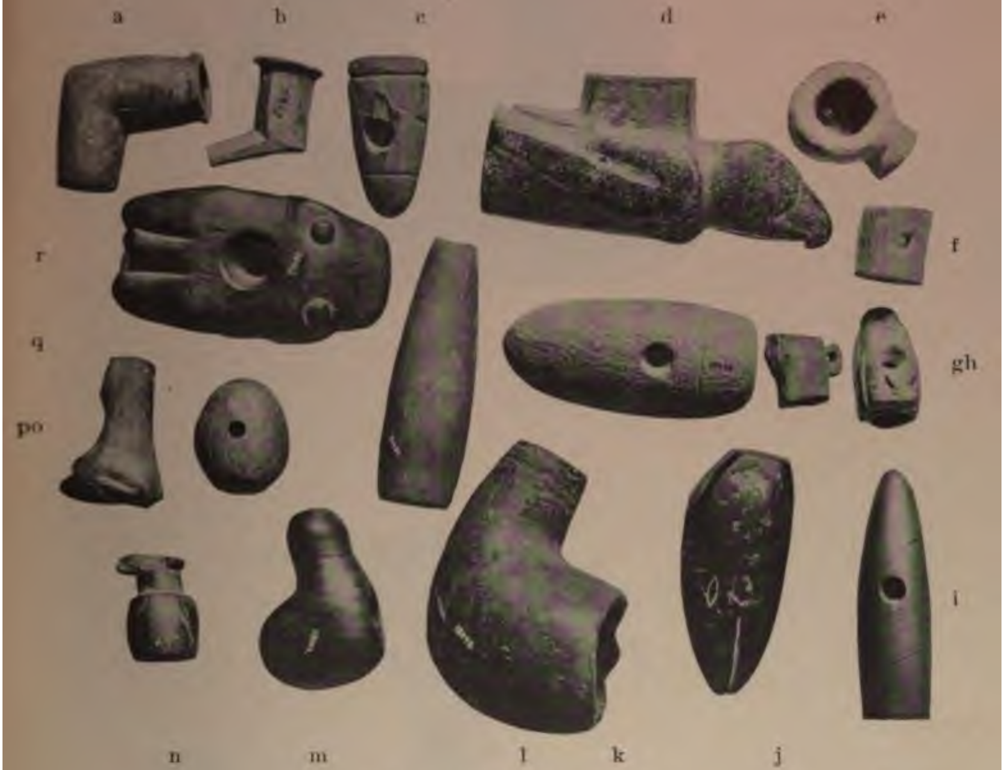

FIG. 64 — GROUP OF PIPES

From various localities in the Mississippi valley

a—Meigs Co., Ohio.
b—Meigs Co., Ohio.
c—Ross Co., Ohio.
d—Forsythe Co., Georgia.
e—Miami Co., Ohio.
f—New England.
g—Geneva, New York.
h—
i—Frankfort, Ross Co., Ohio.
j—Ross Co., Ohio.
k—Scioto Co., Ohio.
l—Yellow Bud, Ross Co., Ohio. (Bogus)
m—Holmes Co., Ohio.
n—Ross Co., Ohio.
o—Richmond, Indiana.
p—Miami Co., Ohio.
q—Pickaway Co., Ohio.
r—Manchester, Adams Co., Ohio.

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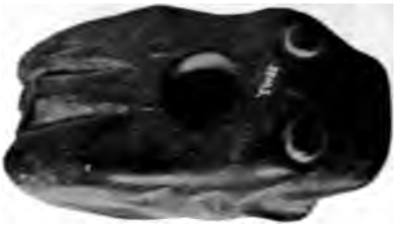


FIG 65 — THE FROG PIPE

From a village site at the mouth of Bush Creek.
Adams County. Ohio S. 1-2

FIG. 66 — BAR AMULET

Tennessee S. about 9-10

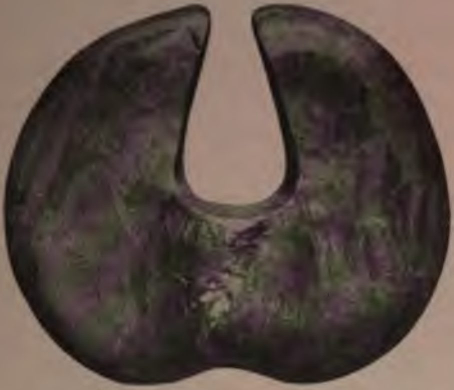


FIG. 67 — PECULIAR CEREMONIAL

Scioto County, Ohio S. 1-2

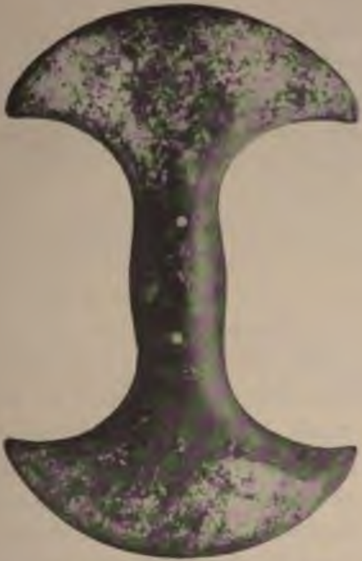


FIG. 68 — CANNEL COAL CEREMONIAL

Mercer County, Ohio S. about 3-10

Found on the breast of a skeleton in a gravel pit.

here presented, but no one seems to know what became of it — an unfortunate thing, most certainly.

Several museums possess fine series of the winged-perforated class. There are comprehensive exhibits in most of the museums; especially at Washington, New York, Chicago, Boston, Columbus, and Philadelphia. Several of the larger museums greatly exceed the Andover exhibit in point of numbers of these unknown forms.

The Department of Archaeology at Andover has been actively engaged since its foundation in the accumulation of unfinished objects in slate, granite, shale, etc. In short, it has paid particular attention to these forms. The net result is that there are some 1600 such specimens in the museum, a large part of which exhibit various stages of manufacture. At some future time it is the purpose of the Department to publish a bulletin devoted to them, and, therefore, the references here will be necessarily brief.

Figure 69 shows four unfinished specimens of the winged type. In none of them is the drilling begun. It was the intention of the aborigines to complete the pecking, grinding and polishing before attempting the perforation. We can readily understand the wisdom of their action. A thin and delicately finished specimen is drilled with safety, whereas if first drilled it is weakened and subsequent pecking or grinding might destroy it. The rougher or heavier work, in most cases, was done first.

Selecting a block of slate or other banded and bright colored material the workman roughly fashioned it, using the ever-present hammer-stone, holding the block edge uppermost; that is, the grain of the stone parallel with the body. He struck it to right and left and then turned the stone over and repeated the process. Not unlike the first chipping on a block of flint is this preliminary work. Indeed the processes are almost identical. A sharp pointed stone is used in pecking the specimen into the form presented by the four objects in Fig. 69. The manipulation is simple and consists of thousands of gentle blows. Grinding follows and last of all the polishing.

Reed drills, the writer thinks, were preferred to others of flint or bone. The drilling in the majority of specimens is very

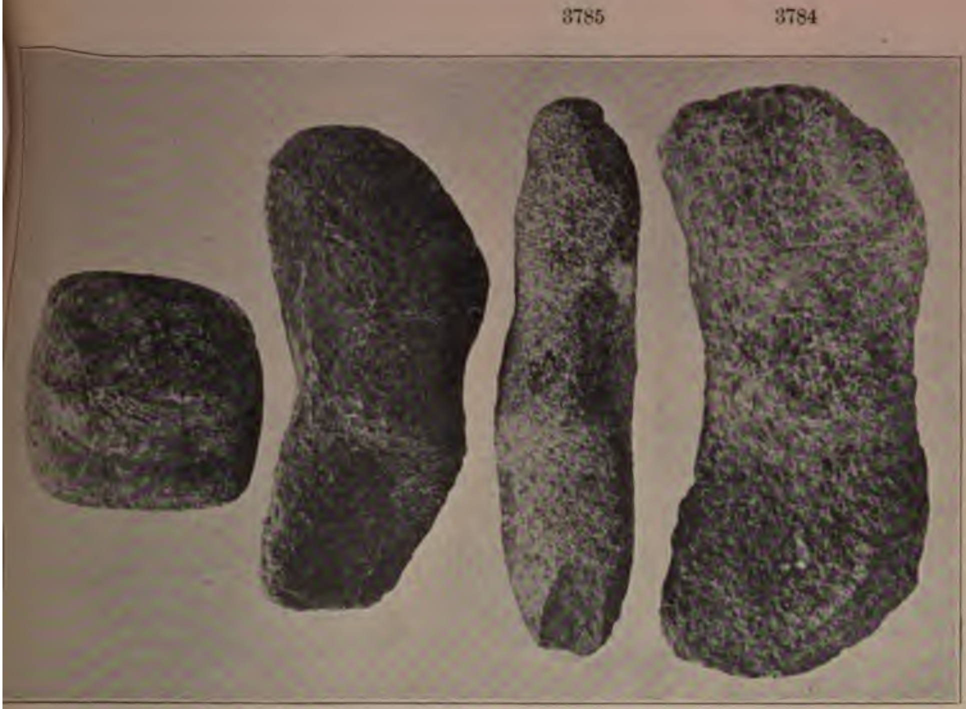
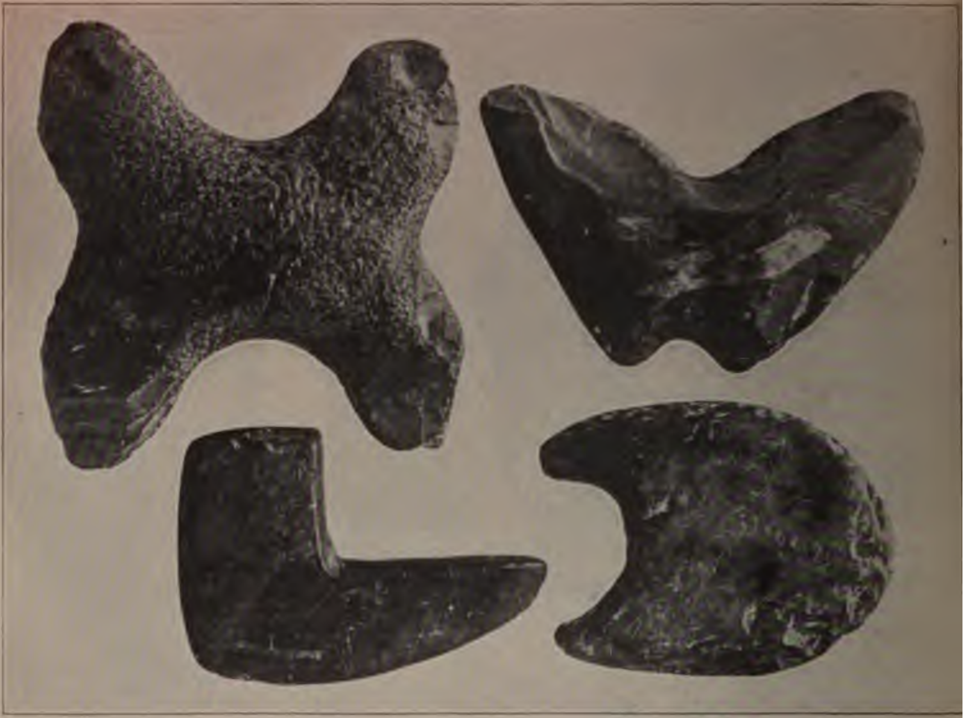


FIG. 69 — EARLY STAGES OF MANUFACTURE OF UNFINISHED CEREMONIAL STONES FROM THE OHIO VALLEY

S. 1–2

Figures 69–70–1–2 were loaned by *Records of the Past*, to whom the writer is indebted.



a
b

c
d

FIG. 70 — UNFINISHED CEREMONIAL STONES FROM THE OHIO VALLEY S. 1–2

even and true. Some unfinished types in every collection contain cores — clear evidence as to the use of hollow drills.

The left hand figure in fig. 69 is from Indiana, the other three were found on Shimer's farm, Martin's Creek, Pa. In the secondary stage the slate-bands scarcely appear, and it is only when the polishing is complete that they are brought out clearly.

In fig. 70 A from Ohio is almost ready for the grinding. C from Ohio, and D from Indiana, have been pecked and the grinding is partly completed. The L-shaped object B (Ohio) is ground and now ready to be polished.

In fig. 71, specimen A is finished. B is all complete save the perforation — as is C. D is polished but not drilled. All are from Northern or Central Ohio.

Fig. 72 shows four completed types. A, the "butterfly," is from Southern Ohio. D, of granite, was found near Cairo, Illinois. B and C are from Ohio and made of slate.

Fig.73 , introduced by way of comparison, shows one specimen quite different from the broad winged types and may, possibly, at some future time, when these objects are better understood, be found to con- vey a different meaning. They are from Western Indiana, of slate and well polished. The larger specimen is of peculiar form.

From the small ovate slate bead one can build up a graduating series until the larged " winged butterfly" is reached. Beginning with the pick one can make a series that ends in the double crescent. The Department grouped three hundred typical specimens into eight or ten different series. The drawings or outlines were made on large sheets of paper, each series covering half a line or more and terminating in some other series. A sheet was mailed to each of the museums and the curators were requested to outline any forms not represented. An examination of the net result enabled one to classify types according to locality, and brings into strong relief the fact in the territory of sedentary tribes these things are most numerous. They are almost entirely absent on the Great Plains and in the Rocky Mountains; they occur in limited numbers in New England. They are not very numerous in the Carolinas or Florida. They are most common in the Mohawk valley, the Ohio valley (in-

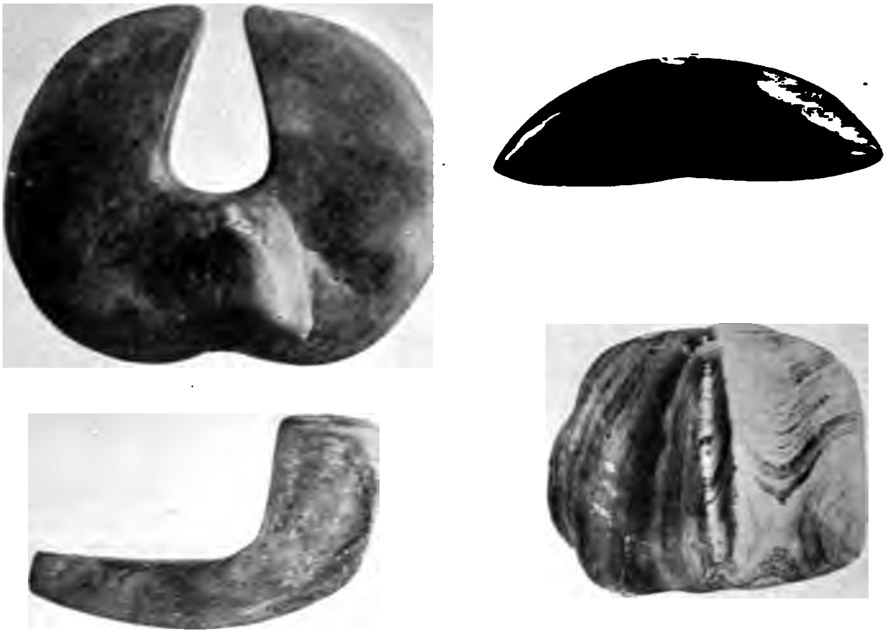


FIG. 71 — CEREMONIAL STONES, NEARLY FINISHED

Ohio valley S. about 1-2

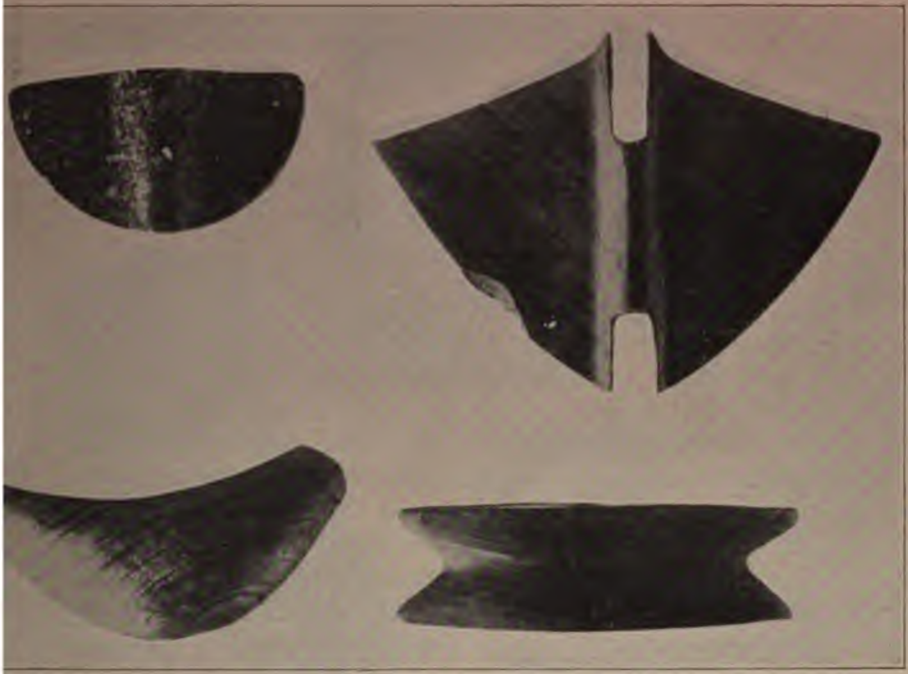


FIG. 72 — FINISHED CEREMONIALS
Ohio valley S. about 1-2

cluding the Tennessee and Cumberland) and the St. Lawrence region. As was remarked in the Department's Bulletin relating to "Gorgets," it is impossible to draw a sharp line of demarcation between many of the series.

It is said of that strange form "bird-stone" that it was seldom met with out of the Iroquois region. That statement to the mind of the writer does not imply that "bird-stones" were used among the Iroquois although such may be the case. Of the "problematical" class as a whole, the claim that they are primarily Iroquoan cannot be substantiated. The range is too great and most of the forms, except the "butterfly," have been found in mounds and gravel interments.

Whether the "winged-perforated" object comes from Wisconsin or Kentucky, the concept is the same although the form may vary.

How did this peculiar form originate? From the north and east did they go westward and southward, or *vice versa*?

These are questions easy to ask and difficult to answer. The modern tribes know nothing concerning them. That they mean more than mere ornaments we are quite willing to concede. A study of the "butterfly" from the rough block of slate to the completed form has given us some new facts. But the primary questions regarding these objects are, at the present writing, unanswered. Whether we shall be able to ferret out a correct interpretation, remains to be seen.

A suggestion made by Professor Edward H. Williams, Jr., of Andover (formerly of Lehigh University), regarding the age of problematical, ceremonial, or ornamental forms should be remembered by museum curators and students. Professor Williams visited the museum and inspected the various collections. During the course of a conversation with the writer he proposed that an analysis and examination of the surface of certain of these stones be made. Accordingly the Curator sent some fifty specimens of the type described in this section of the Bulletin to Professor Williams. In a letter dated April 7th, '06, he reported on them at length. His entire observations will be published in a future Bulletin.

Suffice it to say here that Professor Williams was assisted by Professor John D. Irving who is secretary of the Geological So-

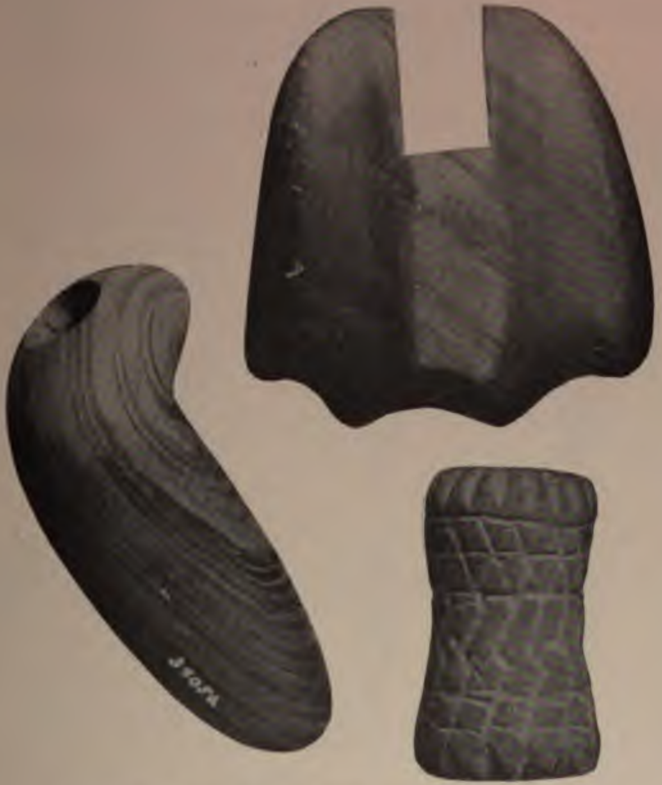


Fig. 73 — THREE PECULIAR CEREMONIALS

From Ohio S. 9–10

Mr. Willoughby suggests that the spool shaped, decorated object was made use of as a stamp. It was coated with paint, then held between the thumb and forefinger and rolled along the arm (or chest), thus leaving a colored pattern.

ciety of America. Both of these gentlemen are thorough geologists and mineralogists. Professor Irving examined each problematical form through the microscope.

It is determined as a result of the examination that some of these stones were weathered or etched to considerable depth. Others appeared more recent. Probably more than one-third of the specimens showed considerable antiquity. In one case a stone was; "originally a dolomitic shale, now highly altered to a metamorphic slate." Another; a decomposed rock of the trap variety had become so weathered and softened that it was almost entirely chlorite. Thus the descriptions continue. The observations of Professors Williams and Irving are important in that they open a new field to the archaeologist in the study of specimens. This microscopic examination coupled with the use of the metric system and a careful study of perforations, of broken specimens that have been remade into others, will doubtless enable archaeologists to solve many problems.

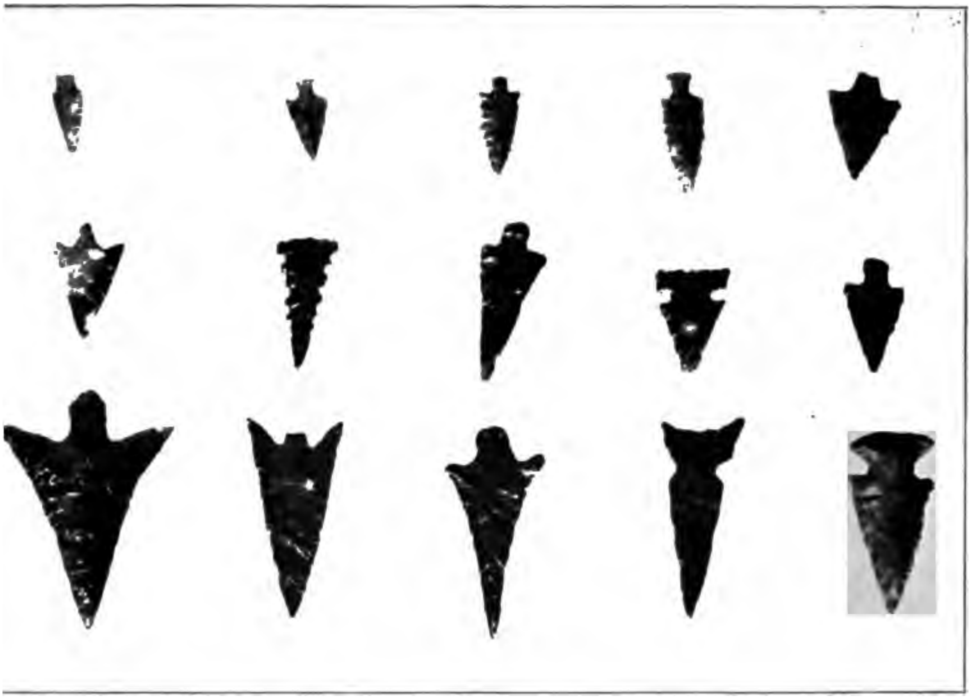


FIG. 71 — ARROW POINTS

From the Pacific Coast — Agate, Carnelian and Obsidian S. 1-1

TWO EARTHWORKS NEAR ANDOVER.

On the estate of Mr. Charles L. Carter, known as Carmel Hill, is a curious, low earthwork almost obliterated. It can be traced on the west side for 53 meters; on the north for 44 meters, and on the east 43 1-2 meters.

At Haggett's Pond, three miles west of Andover, is another embankment totally different from that of Carmel Hill and 66 meters in extent. Both of these earthworks have been superficially examined by the writer and numerous small holes dug in each and in the surrounding ground. Absolutely no trace of the purpose of construction of such works in this vicinity could be found.

The works at both places were reported to the several gentlemen in New England who are interested in colonial antiquities and to Professor F. W. Putnam and Mr. C. C. Willoughby of Harvard University. Both works have been visited repeatedly by the writer and studied carefully but, up to the present, whether they are works of Indians or Europrans it was impossible for him to determine. The work on Carter's Hill is not traceable save on the three sides mentioned, and how far it extends to the south is not known.

Mr. Carter's estate and residence are upon a hill some three hundred feet in height, overlooking a broad valley that slopes toward the north until the Merrimack is reached. The Merrimack, three miles distant, flows east. The valley was a great resort for Indians as all observers in New England are aware. There are many specimens in the museums at Salem, Cambridge, Andover and Concord from this region and some twenty-six collections in the hands of private individuals. In colonial times there were villages at various points from the mouth of the Merrimack to the head of Lake Winnepesaukee.

Mr. Carter's hill commands a splendid view of the surrounding country.

With a view to obtaining the opinion of a more competent judge, Professor Putnam of Harvard, was asked to inspect the

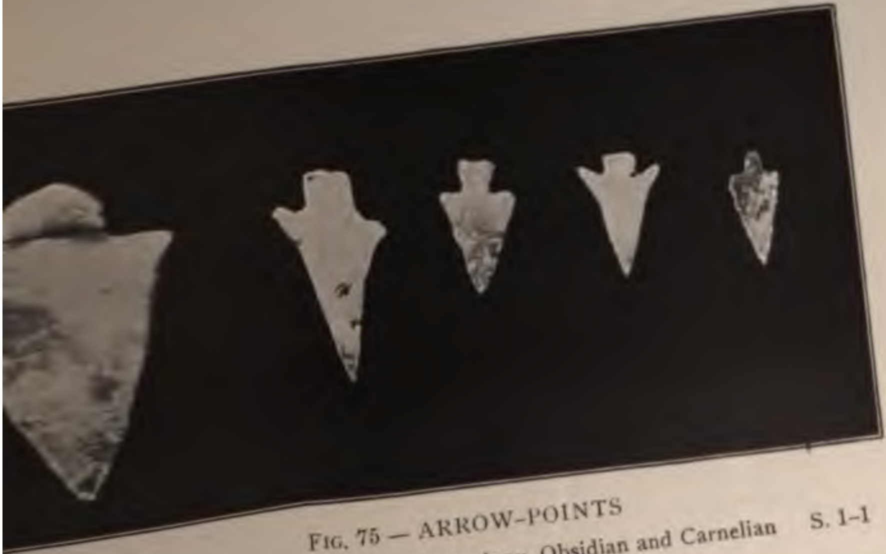


FIG. 75 — ARROW-POINTS

m the Pacific Coast — Agate, Chalcedony, Obsidian and Carnelian S. 1-1

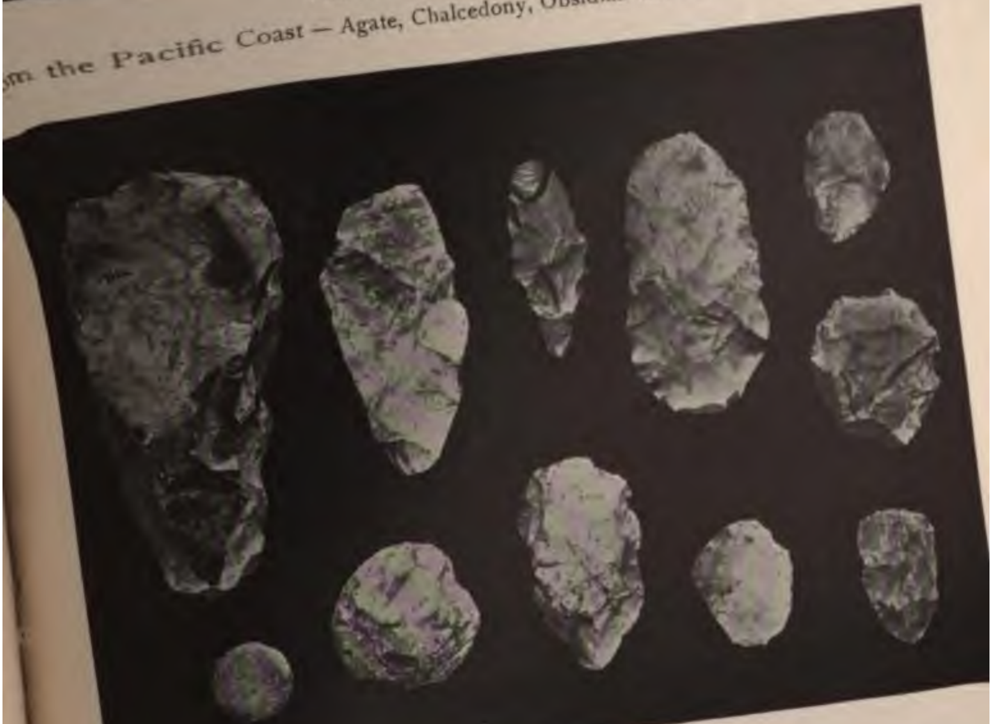


FIG. 76 — DISCS AND TURTLEBACKS

Flint Ridge, Ohio — First to second stages of manufacture S. 1-4

two earthworks. Unfortunately he was unable to visit Andover, but kindly sent his Assistant Curator, Mr. C. C. Willoughby, who is one of the best archaeologists and ethnologists in New England. Mr. Willoughby, in the company of the writer, inspected the two earthworks November 7th. Mr. Willoughby gave it as his opinion that the Carter's Hill work is not Indian; that the hill top had been long cultivated and that a stone wall or a fence once enclosed the space known as the "fortification". Continued ploughing, presumably in the same direction, gradually worked earth from the field against the wall, where it banked up. After the wall was removed the ridge remained as a landmark. He pointed out several other fields, as we drove to Haggett's Pond, where the same condition was manifest. It was clearly to be seen that were the walls removed, small earthen "embankments" would also surround those fields. It is likely that generations of cultivation are required to produce this result. However, with regard to the embankment at Haggett's Pond, Mr. Willoughby was of the opinion that it was a part of an Indian stockade. He based his conclusions upon a careful examination of the site.

The embankment is 66 meters long. The ditch is on the side furtherest from the pond, and the work itself is (estimated) 400 or 500 meters from the water's edge. From the bottom of the ditch to the top of the embankment is some one and one-third meters, although at certain points the ditch is not so deep.

Within the trench, upon the embankment and upon the eastern or pond side, are numerous large old growth stumps. On the opposite side (west) there are no large stumps, and the growth is manifestly of recent origin. The land a few hundred feet to the west has been long under cultivation. The ends of the trench and embankment are nearly obliterated, but enough remains to indicate that at these points they turned abruptly to the west, and continuing, formed originally the northern and southern boundary of the fort or stockaded village. Mr. Willoughby therefore concluded that the present embankment is all that remains of an enclosure which surrounded an Indian town, the northern, southern, and western embankments having been ploughed away and the ditch filled by early owners of the farm. The soil at the point where the embankment still stands may have been poor, or the timber may have been thick and heavy. At any rate, for some reason this portion of the work was not obliterated by the landowners.

The village was rather extensive in size, and palisades crowned the embankment. Mr. Willoughby considered the site interesting and important.

The writer is quite willing to accept Mr. Willoughby's suggestions as to the origin of both works.

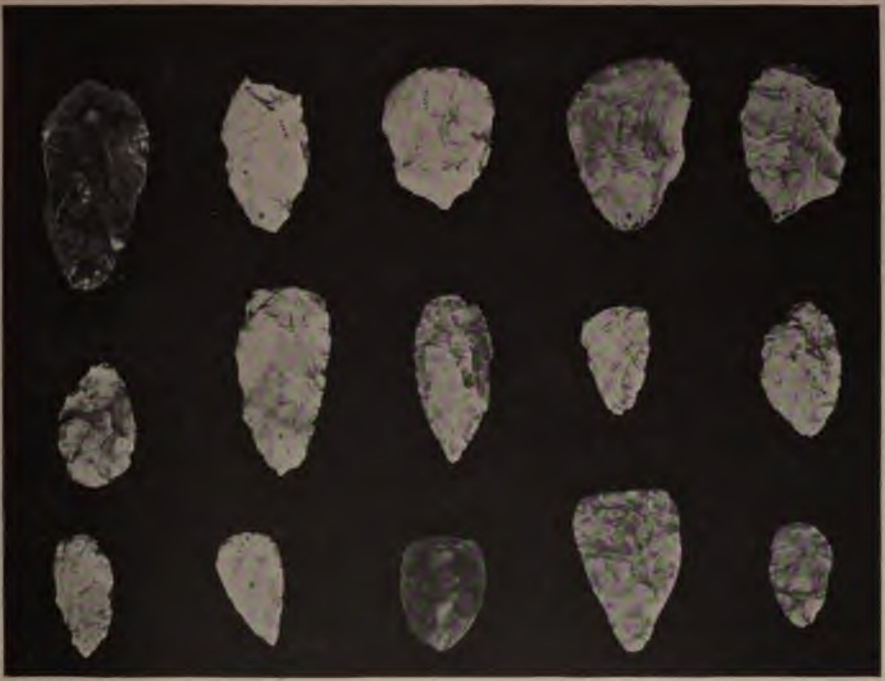


FIG. 77 — LEAF-SHAPED AND UNFINISHED IMPLEMENTS
Flint Ridge, Ohio — Third and Fourth stages of manufacture S. 1-4

UNIV. OF MICH.

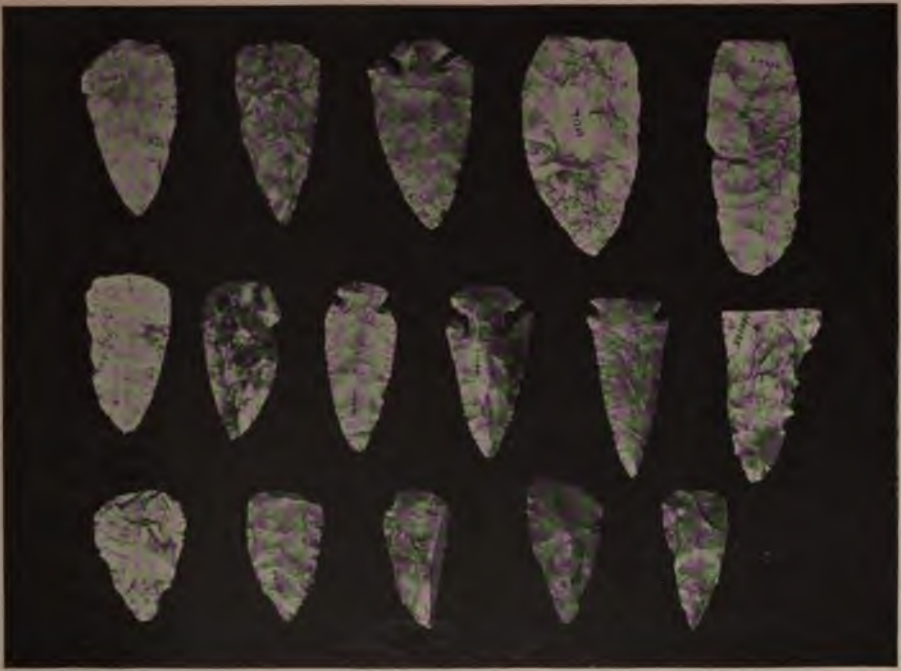


FIG. 78 — BLADES AND SPEARS

Practically complete — Flint Ridge, Ohio S. 1-4

UNIV. OF MICH.

THE PICTOGRAPHS ON A FRAGMENT OF BIRCH BARK

Every museum has something among its collections that cannot be explained. The Department at Phillips Academy, Andover, is not an exception to the rule and we have stored away in one of our cases, in order that the light may not injure the ancient fragment, a piece of birch bark found in the former "buffalo country" near Fairfield, Iowa, and on which are certain pictographs or unknown characters.

Whenever something unusual is found and particularly when such an object is covered with unknown characters, the cry of "fraud" is raised. Let it be understood that the writer does not believe that the so-called engraved stones — that is, stones on which hieroglyphics are carved — are genuine.* And the writer has fondly hoped that he might never find, during the course of explorations, anything that would indicate a knowledge of writing among primitive people north of Mexico. Therefore, this find is personally more or less of a disappointment and the writer wishes to make that statement in all sincerity and with emphasis.

After due investigation and examination, it seems to the Curator that the fragments of birch bark cannot be proved to be a fraud.

First — A sufficient proof of its antiquity is in the fact that the log in which it was found has been cut with a stone axe or celt, and that the closest scrutiny fails to reveal that the cavity within the log was made with steel tools.

Second — That the characters are not a combination of known characters of any language and not such as a child might make or as a person familiar with the English alphabet would be apt to produce. Comparison between that and the tablets known to be fraudulent, reveals no similarity in character, design, conception, or art.

Third — That the human figure surrounded by sun symbol (?) and the animal (buffalo ?) are both exceedingly crude.

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* This statement is confined to Mississippi valley finds.

That the characters are chiefly angles or straight lines accompanied by dots, and may constitute description of country or a map.

Fourth—That Mr. Griffith, who found this, is a plain, honest workman, not a practical joker, knows nothing of antiquities, is not a collector of specimens. Furthermore, that there is no practical joker in the neighborhood.

Fifth—That Miss Emma Clark, an intellectual young lady of Fairfield, Iowa, and a teacher, having heard of the writer corresponded with him regarding the MS., and proposed that it be preserved in a local school or library.

Sixth—That the gum or resinous substance covering the log appears to be aboriginal make and neither wax, glue, or other substance known to white man.

Seventh—The strongest proof of the antiquity of this birch bark fragment lies in the fact that it is not perfect. This in itself is a detail that does not impress one until due study is given the fragment.

As against the antiquity of this interesting object no one has gone on record in print. In fact, the object has not been mentioned save in the newspapers at the time of the discovery. To be perfectly fair to those several gentlemen who do not believe it genuine Indian work, the writer wishes to state that they did not give any special reasons but simply ventured the opinion that it was not genuine.

The history of the find is as follows: September 2nd, 1896, Mr. J T. Griffith was employed as a laborer on the water works excavation. About three feet beneath the surface he dug up a chunk of wood 21 cm. long, 13 cm. wide and 8 cm. thick. This was coated with dark pitch and the whole thing slightly charred in order to add further to its preservation. Splitting it open with the pick there was a space in the center about 10 cm. long and 7 cm. wide and 2 cm. deep in which was a roll of birch bark. As is usual on the Plains a strong wind was blowing and as he unrolled this birch bark what was estimated to be three or four times the size of the present fragment was whipped off by the wind and carried away and lost. Mr. Griffith did not know the character of his find and brought the log and the fragment with him to Fairfield, where Miss Emma

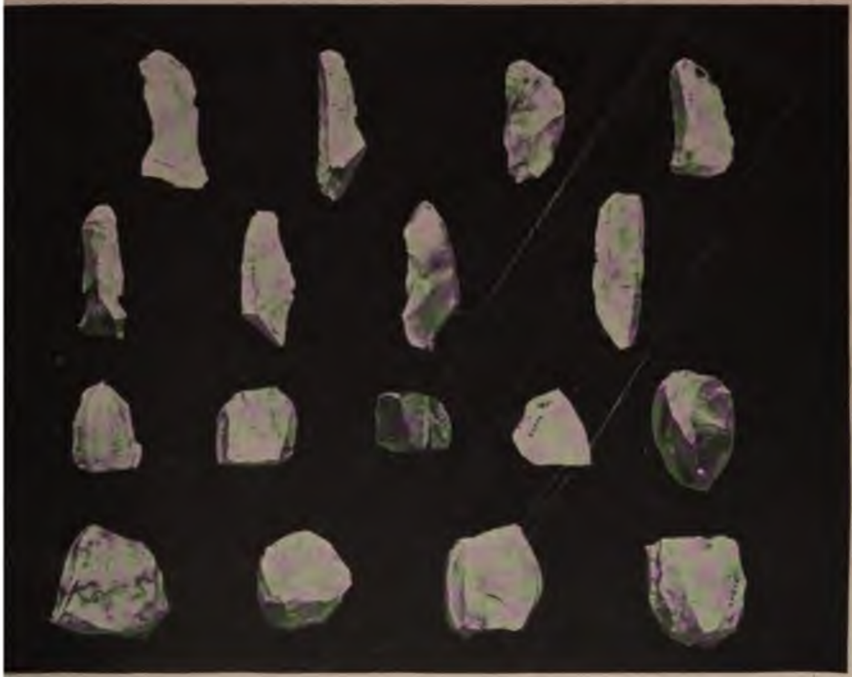

FIG. 79 — FLINT CORES AND FLAKES
Flint Ridge, Ohio S. 1–4

UNIV. OF MICH.

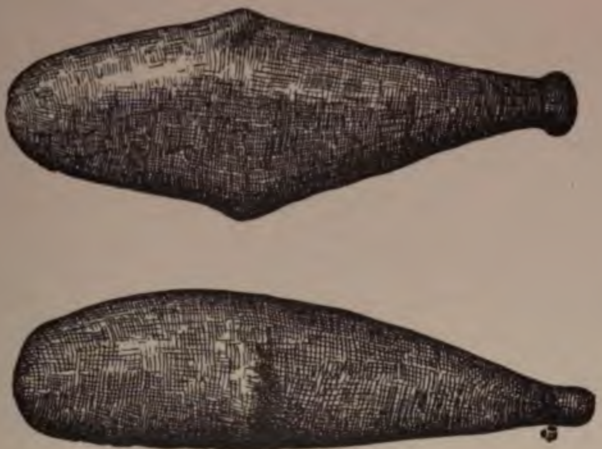

Fig. 80 — EFFIGY OF A WHALE

New England S. 3–8

Figure 80 is a specimen found near Fall River, Mass. It appears to be an effigy of a whale. Number of rude effigies, more or less whale-like in character, are found along the Atlantic seaboard in Connecticut and Massachusetts.

Doubtless the whale would excite wonder in the minds of aborigines — hence the effigies.

Clark, who had heard of the archaeological museum at Columbus, Ohio, corresponded with the writer.

The bark is about as thin as paper, of natural color and well preserved. The writer is informed that there are no birch trees near Fairfield, Iowa. Further excavation revealed nothing. Miss Clark recognizing that something unusual had been found at once enclosed the birch bark between two plates of thin glass. On the reverse of the fragment nothing appears. The editor of the County paper, Miss Clark and other citizens at the instigation of the writer made thorough investigation, all of which substantiated the claim that the "so-called MS." was found as described. The citizens wished to have it preserved in Fairfield. At the time of the discovery no value was attached to it. Mr. Peabody purchased the birch bark and the log for a small sum solely with a view to their preservation.

What these characters mean I leave to others. The newspapers at the time stated that they were Maya or Aztec. Some of the characters may or may not be similar to Mayan glyphs. Mayan scholars must decide that.

The drawings by Mr. Foster present the characters (fig. 82) and the log (fig. 81.) The characters appear to be done in blood. If this is erroneous, the writer courts correction. As they hav faded the past few years, it has been found necessary to keep them in a dark drawer. It is impossible to photograph the log as there is not sufficient contrast to bring out the cutting. Both specimens will be shown visitors at the Andover Museum and as the writer considers the find of exceeding great importance, he would be glad to have a thorough examination made of the site and of the specimens themselves.

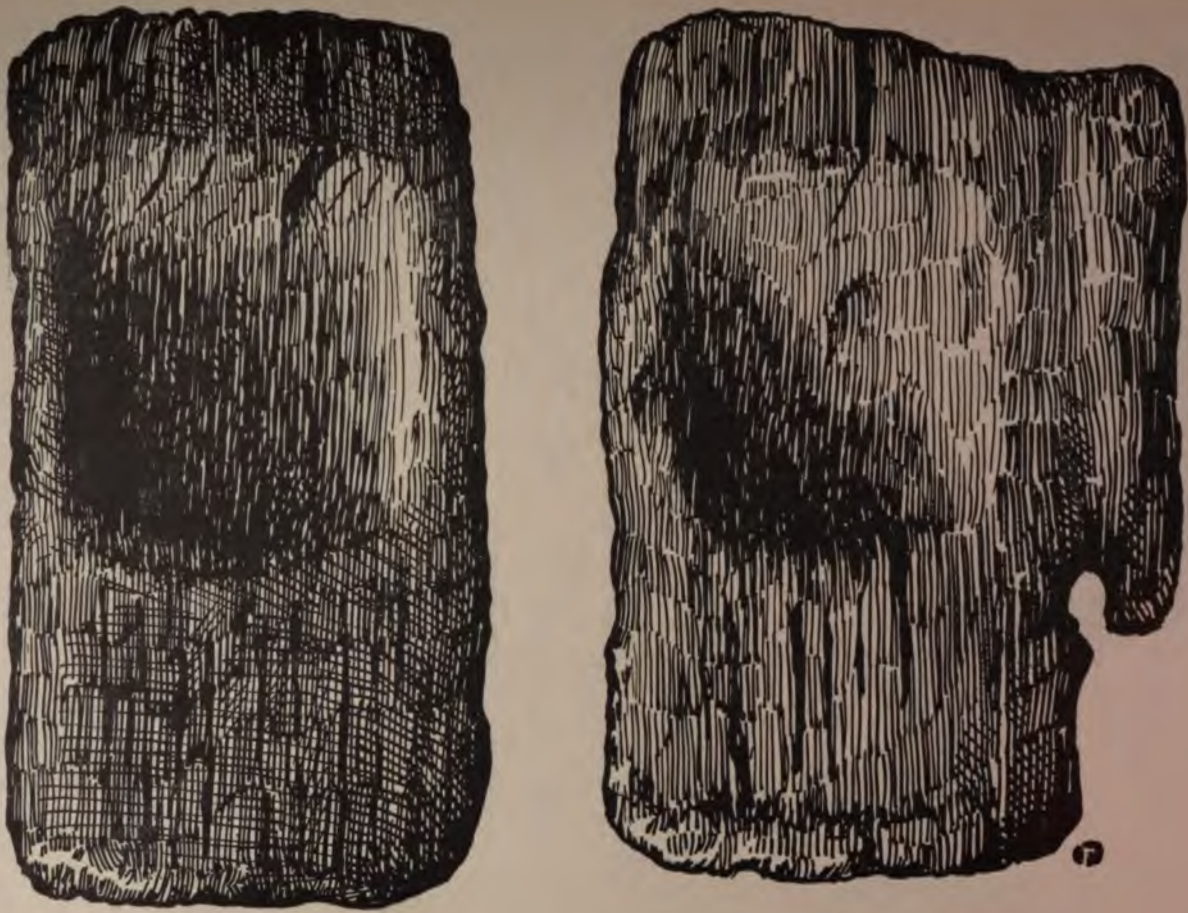

Fig. 81 — LOG IN WHICH THE BIRCH-BARK WAS FOUND S. 1-2

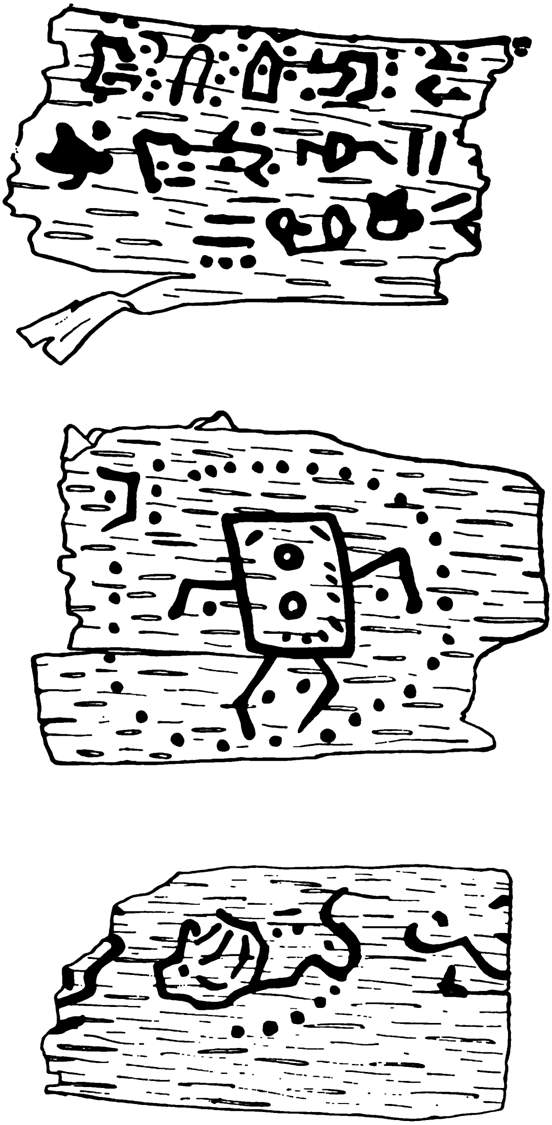

Fig. 82 — CHARACTERS UPON THE BIRCH-BARK

S. 1-2

SYNOPSIS OF SPECIMENS (ACCORDING TO NUMBERS) IN THE PHILLIPS ACADEMY MUSEUM.

In the following totals it will be observed that there are numbers of entries. Hence under the term "ceremonial" the total is not indicative of the number in the museum. "Plummets", "unknown forms", etc., and other names specifying kindred objects, should be included.

"Gorgets" are 57, yet "Ornaments" 296 and "Pendants" 143 would total 496 and they are all of the "So Called Gorgets" class.

Gorgets	57
Pottery, clay objects	5249+
Hematites	249
Pipes	205
Shell objects	2300+
Anchor stones	3
Red breccia	60
Cave breccia	26
Stalagmites	75+
Copper	90+
Human and animal bones	*1510+
Skulls	164
Skeletons	17
Obsidian implements	678+
Flint objects	1752+
Stones and stone objects	480
Slate objects	118
Rubbing stones	67
Adzes	9
Chips and spalls	2000+
Cupstones	22
Paint stones	24
Teeth	73
Effigies	98
Bicaves	82
Tubes	66
Meal grinders	5
Spear-heads	2527+
Arrow-heads	12255+
Amount carried forward,	30262+

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*Includes bone implements

Amount brought forward,	30202+
Knives	2708+
Scrapers	1204+
Triangular points	1308
Projectile points	354+
Broken implements	4833+
Unfinished implements	2878
Celts	1717
Axes	542
Hammerstones	583
Ceremonials	271
Ornaments	296
Pestles	290
Mortars	60
Metates	19
Mano stones	113
Notched stones and sinkers	133
Perforators	412+
Chisels	22
Gouges	87
Discs	713
Pendants	143
Plummets	54
Unknown objects	121
Quarry rejects	163
Wooden objects	11
Photographs	150+
Paintings	2
Prints	27
Negatives	200+
Drawings	376+
Lantern slides	530
Spindle whorls	26
Unfinished chipped objects	84
Bird stones	20
Arrow shaft straighteners	4
Stone and quartz implements	341
Chert implements	23+
Nodules	71
Cones	13+
Tablets	43
Cannel coal objects	6
Tomahawks	7
Amulets	19
Casts	27
Hoes	29
Spades	11
Amount carried forward,	51306+

Amount brought forward,	51306+
Leaf-shaped implements	41+
Turtlebacks	26
Cups	19
Mauls	8
Lava objects	10
Miscellaneous objects	4518+
Total	55928+

LIST OF ACCESSIONS TO THE MUSEUM FROM MAY, 1901, TO NOVEMBER 1, 1906.

In this list the names of residences of donors are omitted.

Name	Objects	Museum No.
Abbott, Miss C. H.	Gouge	26770
Abbott, Howard Y.	Projectile points	2677-87
Addis, Albert L.	Finished and unfinished ornaments and ceremonials	25614, 742, 850, 25874, 875, 31011-15, 32337-39
Adler, A.	Hammerstone	26562
Allen, Thomas W.	Stone implements and arrows	3690+
Amburst, Ferdinand.	Skull	41763
Amherst College	New England Collection	25001-212
Amidon, R. W.	Pottery, bones, etc.	3263+
Amiet, J.	Pottery fragments	20789-891 5100-9385 5365-5390
Anderson, Clifford	Specimens from near Fort Ancient	9301-9385 20947-20999 22561
Angus, L. W.	Spear, arrows, etc.	3149+, 34819-20
Angus, William	Grooved axe	26755
Appleton, R.	Pendants and arrow	21627, 628, 640
Arthur, J. J.	Iron arrow, bone tips	27272-274
Avery, Frank	Arrow-head	21192
Baatz, Capt. C. L.	Hammerstones, flints	23097-177
Batchelder, John	Waterworn stone	
Bailey, A. M.	Grooved hammer	22485
Bailey, H. R.	Maine objects	23276-310
Bailey, J. W. T.	Pottery, shell objects, etc.	5093-95, 32433. 444
Baker, Mr.	Grooved axe	10575
Baker, Mrs. Sue Leland	Pottery	3244-50
Barnes, Frank S.	Set of Archaeologist	Library
Barrott, A. F.	Stone implements	2802-25
Barry, J. B.	Pipes	21631, 634
Bateman, F. A.	New England objects	41670-760
Beale, Albert	Hammerstone	21186
Beencks, Chas. J.	Pottery	2553-60
Bell & Smith, Messrs.	Arrow-head, Axe	4371 ' 3684
Beman, J.	Spear-head	21554

Name	Objects	Museum No.
Boys of Elmira, N. Y.	Arrowh-eads	21768
Brawner, Morgan	Flint implements	21112-125
Briggs, Harry	Stone implements	22481-82
Brown, E. A.	Arrow-head	16432
Bryan, Ward E.	Pottery fragments, flints, stone objects	18510-575,21765-767, 769, 22488, 493-500
Bullis, Roy H.	Stone and flint objects	6971-75, 77-77
Bushm, A. E.	Flint implements	19470-581, 25586-590
Bushey, F. E.	Bushey Cavern material	4798, 41488, 41651-667
Bushnell, D. I.	Maori adze	16428
Bussing, D. S.	Shells, arrows, pottery	5077-90
Butler, Fred	Unfinished ceremonials, pottery, fragments, flints	1777-87
Butts, E.	Pottery fragments and stone objects	2253-59
Caldwell, F. M.	Copper and photos	20429-433,21800, 21802-805, 807
Carter, Charles	Mortar	26513
Carter, N. E.	Unfinished ornaments and ceremonials, sugar quartz objects, etc.	34811-16, 19556, 26761-767, 791-803+
Cary, C. N.	Ornament and drills	21565-66, 600
Chubbuck, C. K.	Axes and flints	23633-665
Clark, William	Celt and arrow	21183, 556
Clegg, Thos.	Skull, stone implements	38897-907-39854, 26416-430
Cleveland, William	Arrow	21569
Clyne, Dr. A. C.	Rubbing stone	4795
Coates, Irving W.	Pottery fragments	16322-43
Cole, John N.	Unfinished object	18585
Craig, J. C.	Hematites,stone implements	16344-380
Cuddeback, Asa	Spear-head	21195
Cummings, A. G.	Arrow-head	3075
Cummings, Mrs. L. A.	Chips	3074
Curts, Milo	Flint implements	26436-449
Dane, L. A.	Hammerstone	29985
Davis Bros., Messrs.	Celt	41669
Decker, J. E.	Flint implements	1794-99
Deisher, H. K.	Skulls, bones, motars, pestles, arrows and spears	25732-860,31092, 31093, 31094, 35625-632
Derby, J. H., jr.	Knives and arrow-heads	24790-798
D'Olier, J. G.	Cast of pipe	20995
Doyle, J.	Spear-heads	21580.583

Vame	Objects	Museum No.
Duprey, H. F.	Shell ornaments, beads, arrows, etc.	2943-46, 3222, 3470-75
Eacker, L. B.	Unfinished stone objects	38173-195
Eastwood, Geo.	Pottery	20376-428
Elder, T. L.	Arrow-heads	Used for exchange
Ellsworth, W. E.	Pottery fragments	18594-615
Emery, Prof. W. O.	Ceremonials	38205+
English, S. A.	Mortar, arrows	2584, 3002-17
Erwin, S. W.	Arrow-head	20594
Farson, J. S. N.	Arrows, etc.	26992-27000
Fenton, W. T.	Cast	20996
Field Columbian Museum	Implements from Trenton gravels, collected by Ernest Volk	27117-263 and used for exchange
Finear, F.	Pipes	21636, 643
Foster, William H.	Stone implements, arrows, etc.	4366 70, 29531-542, 29552-560
Foster, Philip	Gouge, ornament, flint implements, etc.	
Gardine, Bud	Spears and arrows	41565-67
Gesner, Rev. A. T.	Bones from Mandan sites	26826-864
Gilham, F. M.	Obsidian collection	4384, 27287-307
Gillis, Mrs. R. S.	Pottery fragments	
Gillis, A. W.	Axe	27275
Gleason, L. C.	Arrow-heads	24506-507
Gledhill, W. F.	Arrows	19577-21000, 31095-99
Goldsmith, Wm. G.	Mortar and pestle	38206, 88207
Goodell, C. S.	Pottery fragments and arrow-heads	35565-570
Goodnow, H. S.	Waterworn stone	
Gordon, John S.	Quartz implements	18312-318
Gould, Prof. Chas. N.	Rejects	5468-75, 5477-84, 5554-64, 5827-39
h, M. M.	Unfinished and broken implements	27319-332
Alice	Hammerstone	36090
es H.	Gouge	21180
J.	Pottery fragments and flint implements	20136-231
. J.	Pottery fragments and flint implements	16173-205
k L.	Unfinished objects	26966-976
u.	Arrow-head	21555
Mollie	Prestle, celt, flints	23666-672

Name	Objects	Museum No.
Hale, Geo. G.	Arrows, spears and broken implements	4777-87, 4789-94, 24508-517
Hampson, J. K.	Pottery fragments	25702-739
Heater, Spencer	Knife	21584
Herriot, Seneca	Celt and arrows	3495-500, 3503
Higgins, Bryant	Map, stone implements, pipes, etc.	25861-872
Hight, H. H.	Argillite chip	16306
Hill, S. L.	Stone implements	
Hillman, F. G.	Pottery bones, stone objects, etc.	3234-25, 6962-70, 19678-719, 25901-904-9
Hitchcock, T. B.	Mastodon teeth	
Hodge, H. G.	Pottery fragments and arrows	16266-305, 307-310
Holcomb, Benton	Stone objects, slate and stone spears, etc.	18445-509
Holcomb, I.	Stone implements, arrows	20325-375, 22978-989
Holland, Dudley	Obsidian implements	20527-529, 2571-719
Homan, F.	Stone objects, pottery	2266-67, 2927-35
Hope, Claude V.	Knives, arrows, spears	34802-810
Hopkins, A. L.	Hammerstones, scrapers, knives and spears	22196-276, 25291-305, 38255-260, 31024-047, 27277-286
Hopkins, Frank	Projectile points	21585-588
Hovey, G. U. S.	Scrapers	3217, 25, 20434-440
Hughes, F. M.	Ornament	4377
Humphreys, E. W.	Pottery fragments	3252
Husketh, James	Crystal	3223
Hydon, W. J.	Celt	21184
Jacobs, E. H.	Hammerstones, spears, unfinished objects, etc.	38693-895
James, J. B.	Pottery fragments	18680-740
Jenkins, L.	Stone implements	22491, 528
Johnson, C. E.	Pottery fragments	3073
Kern, D. N.	Unfinished and broken implements and pottery fragments	15503-5, 15411-13, 15409, 15415-18, 15421, 15885, 15888, 15982-83
King, Gilbert	Soapstone fragment	18441

Name	Objects	Museum No.
*Kinney, D. A.	Pottery and flint implements	4502-12 18383-392
Latham, Roy	Hammers, quartz implements	16433-560, 662-666, 16669-672
Lathrop, W. H.	Arrows	26991
Lawson, P. V.	Pottery fragments	19645-51,658-60, 19667, 68, 73-76
LeClerc, J. F	Pestle	20589
Levering, Richmond M.	Arrows, celts, stone implements	735-999, 1003-1100, 1111-1250, 1492-98, 1500-1545
Lewis, J. B.	Mortar, pestles, and plummets	3031-47, 3218
Ling, Reamer	Pottery	
Love, W. H.	Chesapeake and tide-water specimens	2952-75, 2977-99
Lowry, Otho B.	Stone implements, etc.	19009-119 26514-560
Ludwig, Daniel	Axe and pestle	3219-20
McLain, W. G.	Stone mortars, pottery	17918-928
McMahon, T.	Broken implements, beads, pipe fragments	21597, 98, 6391, 641, 21642
McWhenney, Mrs. H.	Texas arrows and spears	26576-597
McWhorter, L. V.	Pipes, effigy, stone implements	1802-3, 10538
Marland, Mrs. Abraham	Stone implements from Merrimac valley	3227-32
Martin, W. J.	Flint implements and pottery fragments	19930-996
Mattern, J. E.	Stone implements, flints	3120-25, 27-48 3202-15
Metzger, T. C.	Broken implements and pottery fragments	2847-50
Miller, H. C.	Knives, broken objects, etc.	20703-727
Minchin, J.	Unfinished implements, deer antlers, etc.	20281-324
Miner, Charles	Arrows	18365-375
Missouri Historical Society	Casts of flint objects	35606-624
Mitchell, James	Scraper	20530
Moore, Clarence B.	Pottery, celts, stone implements, discs, crania, etc., from Florida, Georgia, and Alabama	38896-39635, 40275-499 and
Moore, J. E.	Arrows, knives, etc.	26812-825
Moore, Mrs. J. F.	Flint, pottery fragments, obsidian	20728-788
Moorehead, Miss Mabel	Knife and spear	22511, 26758

Name	Objects	Museum No.
Moorehead, W. K.	Various implements	Scattered
Morris, G. E.	Stone implements, arrowheads	27000-625
Mott, Raymond	Stone implements	27323-27431
Neville, T. J.	Flint implements	21562, 573
Newlon, Dr. W. S.	Flint objects	22926-38
Noe, Dr. Chas. F.	Axe, knives, spears	25534-46, 76-85, 15987, 31075-091
Nourse, Geo. D.	Spear-head	2561
O'Brien, W. E.	Celt, broken pipes	21593, 644-50 22397
*O'Brion, John	Knife, scraper, arrows	3466-69
Osburn, A. G. and S. R.	Stone implements	25638-652
Panning, H. G.	Celt, axe, spears and arrows	20579-588
Peabody, Dr. C.	War club, effigy from Greece, obsidian implements, Bushey Cavern material	3102-19, 19661, 41473-487, 489-562, and others
*Peabody, R. S. (Founder)	Original collection collected by himself. All implements purchased or collected for Mr. Peabody given by him to department	All numbers not credited to others
Peck, H.	Beads	21190
Peck, J. W.	Stone mauls	4439-42, 4386-87
Peel, J.	Arrow-heads	21570-571
Penney, J. W.	Pottery fragments	3452-58
Pennock, F.	Grooved hammer	21624
Perkins, C. A.	Unfinished objects, discs and knives	16206-265, 21200-539, 22644, 925 31016-023
Phillips, Chas. S.	Spears, arrows, knives	35985-36088
Pickering, M. S.	Gouges	16312-13
Piper, Richard	Photos.	21801
Pomeroy, O.	Clay pipe fragments	3365-66, 3446
Prentice, G. A.	Discoidal, arrows, spears	2589-600
Price, Miss Anna V.	Arrowheads	1790-93
Prokes, Joseph N.	Tufa.	2587-88
Radley, W. W.	Pottery and flints	4459-62, 4477-87
Reed, Alva S.	Cloth, brass, bones, etc., from Iroquois sites.	2527-37, 2539-43, 25876-900 35798-850
Reeder, J. T.	Sheet copper.	4796-97
Reigo, A.	Knife and spear-head.	21761-62

Name	Objects	Museum No.
Roberson, Wilson	**Flint implements.**	**16381-427**
Robinson Bros.	**Pitted stone, pottery fragments**	**20802-817**
Rogers, E. H.	**Flint implements.**	**16317-321**
Ropes, E. E.	**Pottery fragments**	**38229-254**
Ruggles, Chas.	**Stone implements, pottery**	**3534-50, 3577-99**
Scluyter, C. S.	**Iron axe.**	**21751**
Scott, Wm.	**Celt, spears and arrows.**	**21179, 196-99, 553, 21557-561, 567, 568, 21572**
Seacrist, E. F.	Scraper	26772
Shelby, Mrs. Jane.	Discs, knives, spears, etc.	30999-31010
Shoemaker, L. D.	Sinkers, pottery, arrows, etc.	4452-62, 7529-39, 26759-760
Short, Frank	Gouge and celts	21594-596
Shrawder, W. H.	Pipe, gorget, flints	22402-407
Simpson, Prof. A. M.	Mandan pottery	25601-603
Slade, W. S.	Notched stones and flint implements.	4379-82
Smart, J. A.	Spear-head.	35782
Smith, C.	Bird stone, perforated stone, spear-heads	21752, 58, 63, 64
Smith, J. R.	Unfinished, broken, and quartz objects	3233-43,30018-35 34294-306 35779-80
Smith, J. T.	Knives, discs, etc.	22939-977
Smith, S. L.	Knife	22487
*Smith, W. N.	Obsidians	25638-52, 25701-17
Smith, Z. T.	Flint implements.	22201-380
Smithsonian Institution.	Stone implements	21006-25, 32-44, 21052-69, 77-91, 21102-110
Snively, Benj.	Celts and arrows.	2564-75, 3685-89
Stannard, Mr.	Fossil, stone point	18442-43
State Historical Society, Des Moines, Ia.	Cast of large axe.	41764
Stearns, Samuel.	Unfinished New England implements	
Steinbrueck, E. R.	Mandan material.	2353+, 2377+, 2520+, 26910-961
Stewart, Arch V.	Spears, arrows, beads, etc.	38318-344
Stewart, Mrs. Susan A.	Stone implements, unfinished objects, arrow-heads, etc.	3477, 3003, 4800, 15259-62, 396-97, 15399, 402, 26768-69
Stiefel, Victor H.	Arrows	Used for exchange

Name	Objects	Museum No.
Stilwell, L. W.	Unfinished ceremonials	9231+, 9245+, 22517+, 27264+
Stoddard, R.	Bone and flint implements, pottery	2714-25
Strevell, C. N.	Broken and unfinished flint objects	20001-135
Swarthaut, G. E.	Gouge	21592
Swift, R.	Gouge	22490
Talbot, A. R.	Hammerstone	2585
Tarbox, Mrs. C. W.	Clay object	4383
Taylor, J. D.	Unfinished axes	9111-13
Taylor, J. L. B.	Material from the vicinity of Jacobs Cavern	21188+, 22398+, 26450-512
Taylor, W. A.	Hammerstones	3258-62
Thacker, W. H.	Pestle, anchor stone, hammerstones, slate points, etc.	3048-50, 52-71, 5052-56, 58-66, 5069-75,20531-39 25571-575
Thomas, J. D.	Arrow-heads	21770-778
Thompson, C. A.	Pottery fragments	35636-660
Tooker, Paul S.	Unfinished objects, sinkers, spears, etc.	10537, 37796-38149
Treganowan, Alfred	Hematites, triangular points, pottery, etc.	20540-550, 553-558
Tuttle, L.	Unfinished object	21756
Tweed, J. W.	Arrow-heads	Used for exchange
Updegrove, Harry T.	Unfinished stone objects	26773-790
Van Kirk, J. W.	Stone implements, flints, and pottery	35934-956
Van Rensselaer, Stephen	Perforator, spear, arrow	25568-70
Vaughan, F. E.	Shell objects	26979-984
Walsh, Thomas	Stone implements, and broken ornament	38901-904
Ware, Geo. O.	Arrow-heads and knives	22991-23020
Warner, Miss Rose	Pottery fragments, flint chips, shell	38261-317
Waterbury, A. H.	Drill	21760
Welch, Irving	Celts	21753-55
Welty, John	Stone objects, mussel shells, pottery fragments	16809-925 19652-53,, 35740-752+
Wemmet, Clarence	Celts, knives, bone beads, pottery, etc.	21185, 574-75, 21577-79, 618, 629, 21630

Name	Objects	Museum No.
Westbrook, E. H.	Paint stone and pestle . . .	21277-178
Whelpley, Prof. H. M. .	Flint implements	16721-730
Whitney, Dan	Celts, hammerstones, beads	21181, 82, 87, 91, 21590
Wilcox, Calvin	Celt and grooved axe	22480, 484
Williams, Prof. E. H. . .	Scrapers, arrow-heads, knives, etc.	26382-26415
Wilson, F. A.	Unfinished stone objects, arrow-heads, etc.	2502-512, 2514-19
Wilson, G. H.	Birdstone, flint implements	21599, 602-610
Wing, E. T.	Stone implements	23178-195, 401-427
Witmer, Dr. I. M. . . .	Arrow-heads	35912-933
Wooff, J. W. P.	Flint implements.	20232-280
Wren, Christopher . . .	Sinkers, jasper objects . . .	2936-44
Wright, B. H.	Stone implement	22486
Young, Calvin M.	Pottery fragments	4385

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*Deceased.

THE PRESERVATION OF ARCHAEOLOGICAL SPECIMENS.

It will be seen by the foregoing pages, that it was the purpose of the founders of this Department to encourage the study and preservation of archaeological material. As the museum building is fireproof, it offers a safe repository for collections.

The circulation of BULLETIN No. III will be somewhat extensive, and the Curator wishes to call attention of the alumni of Phillips Academy and of collectors of archaeological specimens, as well as those persons who know of such exhibits, to the Department.

The Curator will be glad to enter into correspondence with persons who know of prehistoric village-sites, mounds, caverns, or other places of archaeologic interest. The Department particularly desires specimens from various portions of the United States, and will pay transportation charges upon such and give the donors due credit in the official catalogues and BULLETINS.

APPENDIX

A BRIEF DESCRIPTION OF FLINT RIDGE*

BY GERARD FOWKE

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* Reprinted from *Primitive Man in Ohio.* New York, 1892.

APPENDIX.

FLINT RIDGE.

Aboriginal man was a practical lithologist. Unacquainted with any method of reducing ores, he was unable to avail himself of the harder metals, and consequently was compelled to utilize some form of stone in the manufacture of implements intended for ordinary use. The glacial drift, covering three-fourths of the State, furnished an abundance of material for axes, pestles, celts, and other utensils required for rough work; but, while quartzite, syenite, and diorite are well adapted for making any tool or weapon which must be both hard and tough, they are unsuitable for use when a keen cutting edge is necessary. For the latter purpose nothing else at the command of the ancient artificer was so suitable as the different varieties of chalcedony. Obsidian and the various forms of agate, so plentifully at the command of Indians in the extreme west, could not be obtained by the prehistoric inhabitants of the Ohio valley, who were therefore forced to adopt the flint, hornstone, chert, and chalcedony found nearer home. These occur in quantity from central Ohio eastward, generally imbedded in limestone, but sometimes replacing that rock to a small extent. Many of these deposits contain stone that is coarse, impure, of uneven texture, or otherwise unsuitable for the needs of the primitive hunter or warrior. Direct exposure to atmospheric agencies also detracts from its availability, the manner of cleavage being so altered that the stone no longer splits into conchoidal flakes when struck, but shatters or breaks into irregular fragments. Thus, while a small, sharp-pointed fragment of stone, such as could be picked up almost anywhere, might be serviceable for an arrow-head, the requirements of a manufacturer of finer flint implements were more difficult to meet. He must have a stone very hard and compact, of homogeneous texture, free from any admixture of foreign material, with a definite line of fracture that could be determined beforehand, and covered by a stratum of earth or rock which would prevent deterioration by weathering; at the same time the overlying mass must not be of such depth or solidity as to prevent convenient access to the desired material.

In the State of Ohio there are two flint deposits presenting these essential features to a marked degree.

The first of these is between Newark and Zanesville. At no other place in the Ohio valley can be found so great a quantity of this material; and probably nowhere else in the United States are to be seen aboriginal excavations on so extensive a scale. The magnitude of the deposit is such that it has given to the locality the distinctive name of "Flint Ridge," by which it is well known to geologists and collectors. Its outline is extremely tortuous, owing to the erosion that has made the whole country a succession of hills and ravines. Throughout its length it forms the cap-rock of the high land, all the superincumbent material having been either removed or converted into soil.

The salient points of the surface in the region being practically in a horizontal plane, while the dip of the rock is to the southeast, it follows that the flint stratum was, at its eastern end, first covered by a considerable thickness of earth. The rounded knolls characteristic of the landscape are in some places eighty feet above the flint. This, however, is not common; for the most part the overlying earth is only a few feet in depth, and toward the ends or sides of the numerous ridges the flint stands out in relief.

Geologically the formation belongs to the carboniferous or coal-measure rocks, being the last or uppermost layer of the "Putnam Hill Limestone" of the Ohio Geological Survey.

A fine bed of cannel coal lies one hundred and four feet below the flint, and is mined on a considerable scale. Bituminous coal also is found south of the ridge, some distance below the level of the flint stratum: the exact interval has never been measured. If the Kittaning coal of the Pennsylvania Geological Survey were extended thus far toward the west, it would lie about thirty-five feet above the flint.

The western extremity of the flint is found in a detached hill in Franklin Township, eight miles southeast of Newark. It here appears as a porous stone, similar to buhr or millstone, but more open or cellular. This continues only a short distance, when it is cut off by a depression formed by ravines having their beginning on opposite sides of the ridge, of which this hill was formerly a part. These ravines have worn back until they have broken down and removed all the flint, as well as much of the subjacent rock.

Beyond this depression is a level tract extending eastward a little more than a mile, with an average width of about four hundred yards. Much of the flint about the outcrop is of the same nature as that to the west; but there are several places where the exposed portions are quite solid and nearly white in color. The main body of the deposit has been protected from weathering by a considerable thickness of earth; in places where this has been removed the flint proves to be translucent, very dense, and with a decided tinge of blue, thus almost answering the description of chalcedony.

Another depression similar to the one noted above, and due to the same cause, terminates this body of flint to the east. In this, on the north side, is a mine from which the cannel coal has been taken for many years.

Reappearing east of this depression, the flint extends without another interruption for nearly three miles. The outcrop along the northern side of the ridge in this part is tolerably regular, and follows, approximately, an east and west line; on the southern side, however, several spurs project to a distance of more than half a mile. There are also detached hills and ridges which once were connected with the main ridge, but have been cut off by erosion.

Beyond this large area of flint is an interval of three fourths of a mile in which the flint is entirely absent, except in scattered fragments or boulders sufficiently compact and homogeneous to resist the destructive atmospheric agencies that have reduced the general level from forty to sixty feet below the surface of the limestone which underlies the flint stratum.

After passing this the flint is again found, but much of it is buried beneath a thickness of earth that precludes any definite knowledge of its nature. Such of it as is visible, either along the slopes or occasionally in places on the surface where removal of the soil has been more marked, is either buhrstone or a white, compact stone whose monotony of color may be due to weathering; for fragments about the ancient quarries show a considerable variety in texture and color, many of them being quite translucent, others containing an amount of carbonaceous matter that makes them almost black, while still others have the bluish-gray tints of chalcedony.

This portion of the deposit, which at one point is almost a mile in width, extends in a general easterly direction for fully a mile beyond the Muskingum County line; it then trends toward the north, forming a curve whose farthest limit is a mile to the north of any other part of the ridge.

How much farther it may have extended eastward cannot now be ascertained; but the present termination is certainly much within its original boundary, for the rock which juts out from the hillside at its very extremity is thicker than the flint at any other point, there being a vertical exposure of fully seven feet. How far downward it may reach is not known. In a number of places in the west and middle portions of the ridge, wells have been dug and other excavations made; but nowhere has the stone been found more than four feet in thickness.

The entire length of the deposit, measured on a section line, is eight miles, and its greatest breadth is three miles. Its actual area as it now exists is probably not more than four square miles, the remainder having been removed by denudation. It is not improbable that, as deposited, it comprised fully thirty square miles, with an average thickness of four or five feet.

Baryte is found in small quantities in some places; quartz crystals are abundant; while nearly all the flint, except the clear chalcedony, is highly fossiliferous.

As to the evidence of human occupation and industry, the first remains of this nature are on the western end of the level tract mentioned as extending to the depression in which the coal mine is situated. A space of about ten acres is here surrounded by an ancient wall built of flint blocks that have been gathered up along the outcrop on the hillsides. The enclosure has almost disappeared, the stones composing it having been hauled away by those cultivating the field. Enough remains, however, to indicate its outlines. It commanded the valleys to the north and south, the wall being carried along the hill just at the top of the slope on either side, and connecting across the level surface of the ridge. Before being disturbed it was fully five feet in height and eight or ten feet in breadth at the base.

Within the walls are two mounds not more than thirty feet apart. One, built entirely of earth, is fifteen feet in height, and seventy-five feet in diameter at the base; the other, a pile of loose stones heaped together, is not more than three feet in height, with a diameter of fifty feet.

This structure was undoubtedly designed as a fort. From the north or south, approach is possible only by climbing a steep hill strewn thickly with angular fragments of flint and sandstone; from the east or west an attacking force would have a level space to cross, with little opportunity for shelter from the missiles of the defensive party.

Nothing else of artificial character is found on this hill; there are no quarries, workshops, or other remains, until the great deposit east of the coal mine is reached. Here occur the most interesting features of the entire region. Few persons have ever seen more than a small part of it, and yet such superficial examination as can be made in a day's visit will impress the observer with a feeling that he is viewing the scene of operations by comparison with which the construction of Ohio's most extensive earthworks would be mere holiday sport.

On almost every farm thousands of cubic yards of earth have been removed that the flint beneath might be reached. Acre after acre has been so thoroughly excavated that scarcely a single foot of earth or stone retains its original position. Hundreds of wagon-loads of spalls cover the ground, the refuse of ancient implement making. In many places one may walk forty rods or more in a direct line with the certainty that nowhere within fifty feet of him would it be possible to find a spot that had not been dug for a depth of five to fifteen feet, or even more. To comprehend fully the labor necessary to accomplish all this, it must be borne in mind that the subsoil is as solid as the earth in a public highway. Sharp picks, wielded by muscular arms, cannot be driven into it more than two or three inches. The stone, when reached, is so extremely hard that, unless favored by a baryte or crystal deposit, a person, in digging a well, for example, may have to work an entire day with the best steel drills in order to make a hole deep enough to put in a blast. When one witnesses the slow progress made by good workmen aided by steel and powder, and remembers that the Indians had no better tools than they could fashion from wood, bone, or stone, and when he finds further, that it requires several days merely to walk over the area included by the ancient quarries, he realizes the vast amount of toil involved in these excavations.

Eleven miles from Newark the Zanesville road is intersected by the road leading from Brownsville, on the old National Pike, to the Baltimore and Ohio

Railway. This point, locally known as "The Ridge Cross-road," is one mile east of the coal mine, and three miles north of Brownsville. For fully half a mile to the east, west, and south, and half that distance to the north, the debris from pits and workshops literally covers the surface, not only on the spurs and minor ridges, but in many places on the lower ground. Most of the stone is very solid, though some of it is so porous as to be unfit for use.

One of the pits near here is almost a hundred feet in diameter. A pole eighteen feet long has been thrust full length downward into the muck with which it is filled, without reaching the bottom.

The flint in this entire central area shows an almost endless diversity in coloring. Much of it is milk-white. There are large beds, perhaps a hundred acres in all, of striped jasper, the colors being alternate light gray and dark gray in thin and regular bands. This is an excellent material for arrow- and spear-heads, and has been extensively quarried. Segregated masses occur of lustreless, dull black, gray, or yellowish-brown. These contain various impurities, and apparently were not sought after. At various places, but mostly in the immediate vicinity of the cross-road, are immense deposits of what should have a distinct classification as "Flint Ridge Stone." It is a chalcedony, pure or nearly so, but differing somewhat in appearance from that in any other known locality. When thoroughly protected from weathering it is of a light grayish-blue color, translucent in pieces of considerable thickness, exceedingly hard, and yet, when freshly dug, easily wrought by the usual methods in vogue among modern Indians. When exposed to the atmosphere for a long period it assumes an almost infinite variety of tints, equalling or even surpassing in beauty and brilliancy the finest agates or carnelians. But, no matter how it may have changed in other respects, it retains a peculiar gloss or lustre that enables one familiar with it to detect at a glance an implement from this locality, no matter where it may be found. This property has been useful in aiding to establish two facts. First, that people using it covered a wide territory; weapons made from it have been found in New York, Illinois, and eastern Virginia, as well as nearer to its source. Secondly, that the aborigines resorted to this spot for a long period of time, perhaps many centuries; chips or blocks of exactly the same composition found side by side on the surface vary greatly in appearance, some being as yet scarcely affected by the exposure, the exterior of other pieces being completely changed in color, while in still others the change of color may be uniform through the fragment.

It was quarried anterior to the construction of some, at least, of the large mounds in Ohio and West Virginia, for many arrows, cores, and flakes of it have been found in them. In the large mound described in chapter xiv., a chip of it was found lying upon the original surface as if it had been carelessly thrown there prior to the beginning of the first or oldest part of the mound.

It was unquestionably used by the Indians occupying the Ohio valley at the time of its settlement by the whites, for thousands of implements made of it have been picked up on or very near the surface of the ground in spots where it is known that modern tribes had their domicile in quite recent times.

Several hills situated between the ridge and the National road were once part of the plateau covered by the flint; but erosive agencies have cut them off, and they are now entirely isolated. On all of these which retain their former elevation excavations have been made on a very large scale. None of the material here, however, has the diversified colors so noticeable in that nearer the cross-road.

The only indications of permanent occupation along this portion of the ridge are three circular enclosures—two near the cross-road, now obliterated by cultivation, the third a mile and a half south. The last, which is still quite distinct, consists of an embankment with interior ditch, the outer diameter being about three hundred feet. They are probably the sites of small stockaded villages or camps. There are also two small mounds of earth, both of which have yielded human bones to investigators.

On the third principal deposit of the flint, that lying along both sides of the line between Licking and Muskingum counties, the excavations are on a smaller scale than those heretofore noted. There is but one group of pits west of the county line; these extend over an area of five or six acres. They occur at a place where the covering of earth was quite thin, and present no features worthy of special notice.

The first excavations in Muskingum County are small. The stone is of the same general character as the chalcedony at the cross-roads, and therefore well adapted to the uses made of it; but the quantity of earth to be removed before it could be reached was an obstacle too great to be overcome, and the attempted quarries had to be abandoned.

It is not until the margin of the flint area in this direction is reached that evidence of extensive work is found. Almost the entire spur forming the northern and eastern extremity of the deposit has undergone extensive denudation, owing to the peculiar arrangement of the drainage system about it; consequently the stone is easy to reach. The pits extend very nearly to the final outcrop on the east and as far toward the north as workable material is to be obtained. But they are all shallow, and the immense piles of refuse show that only a small portion of the stone obtained was fit to be wrought into implements.

Careful researches by various parties have shown the methods by which the primitive worker obtained the coveted material and made from it weapons or implements suitable to his wants.

Probably numerous experiments and repeated failures in working the fragments found on the surface had taught him that if he wished to make specimens of symmetrical form and definite outline, he must procure a stone that was solid and uniform in texture. Either by accident, or by the use of his reasoning powers, he discovered that such material is to be found in the ground instead of upon it.

Digging away the earth with such tools as he could improvise—pointed sticks hardened by fire, antler, bone, or stone,—he came to the surface of the flint. This resisted all his efforts until he thought of the effects of heat. Placing wood upon it, he set fire to the pile. When the stone had reached a high temperature he threw cold water on it; this caused it to shatter and crack in all directions. Casting aside the fragments, he repeated the operation, until he had finally burned his way to the limestone beneath. Removing all burned portions of the flint, he next procured a quantity of fine clay and spread a thick coating on the top and sides of the stone, to prevent injury to it. Then building a fire at the bottom of the hole, he soon burned away the limestone and the lower part of the flint stratum, leaving the top projecting. This he broke loose with large boulders of quartz or granite; hammers of this sort, weighing from twenty to one hundred and fifty pounds, have been found in the bottoms of pits that have been cleared out. Knocking loose the clay, which had burned almost as hard as the stone, he found himself in possession of a block of clear, pure flint. By means of the same hammers he broke this into pieces of a convenient size for handling. These were carried to a spot near by, which may be termed a "blocking out" shop. Here they were further broken by smaller hammers, and brought somewhat into the shape of the implements which were to be made from them. The work was never, or very seldom, carried beyond this stage at the spot where it was begun; the subsequent manipulation was at some other place, best designated as a "finishing shop." These are characterized by quantities of small chips, flakes and spalls, broken implements, and unfinished pieces, which were unavailable by reason of some flaw or defect not discernible until the final work was begun. The finishing touches were always made by means of pressure with a bone, antler, or some other tough substance. Many finishing shops are located near the quarries, others at a distance, some of them several miles away. The principal one was near the cross-road; here a pile of fine chips, covering one fourth of an acre, and fully six feet in depth at the central portion, existed when the country was first settled by the whites, but from various causes it has been reduced until it now is all of one level. This, while the largest, is only one of several hundred such places.

Second in importance only to Flint Ridge are the aboriginal quarries of Coshocton County.

They are located on the south side of the Walhonding River, four miles above Warsaw. The flint forms the cap-rock of a high hill intersected by numerous ravines, and is covered by a layer of earth whose thickness varies greatly owing to the contour of the surface.

The area worked over, the piles of earth thrown aside by the diggers, and the fragments and blocks of stone scattered about in profusion, show that this was long a place of resort by the Indians.

In one place is a pit more than one hundred feet in diameter, whose depth has never been ascertained, owing to the accumulated earth and decayed organic matter that forms a bog within it; but the quantity of debris scattered on every side shows that a great amount of labor was expended in opening it. In many other places in the vicinity smaller holes bear witness to the same industry. As a rule, these follow a line parallel with the outcrop of the flint. One of them has been cleared out, and the process of excavation found to be the same as that followed at Flint Ridge. On most of the hill-tops, the superincumbent earth, having in some places a thickness of twenty-five feet, or even more, proved an efficient barrier against such tools as the ancient workers could procure.

The most interesting feature of this quarry is in a ridge or promontory bounded on three sides by the river and a deep ravine, the sides being very steep—almost precipitous in places. A careful exploration of its summit has never been made, but sufficient evidence is at hand to justify the statement that the Indians began work at the outcrop on one side, next to the river, and followed the flint stratum entirely across to the outcrop above the ravine, throwing the earth and refuse material behind them as they proceeded. Probably five acres have been removed in this manner, while the sum of the areas dug in the different pits would be still greater.

The flint forming this deposit is of various shades, from a pale amber or "honey color" to a jet black, much of it being banded like agate, or variegated with colors imperceptibly blending. The lighter varieties are translucent or almost transparent, in pieces of considerable size; the darker are usually opaque except in very thin chips. In much of it the grain is as close as in the finest agate or chalcedony, consequently it is susceptible of very delicate manipulation. Some of the specimens from this locality are as thin, symmetrical, and highly finished as can be found among the best of those belonging to the neolithic age of Europe, and many may be found which, after decades or even centuries of exposure to an inclement climate, have an edge or point almost as keen as a piece of freshly broken glass.

To a people living in the condition of the early inhabitants of the Ohio valley, stone possessing such qualities was invaluable. Arrows, spears, and knives were essential to their existence, and in the absence of steel or iron no better material is obtainable for the manufacture of such implements than the finer grades of chalcedony, of which the Coshocton flint is a variety, or the "Flint Ridge Stone," which is fully equal to it. That the aborigines fully understood their worth for such uses is proven by the evidences still remaining of the great amount of labor which they performed in obtaining them.

There are various other flint deposits in the State that have been worked to some extent, notably those in Perry County. In fact there is scarcely a county along the line of this geological formation, from the western border of Pennsylvania to central Kentucky, where these flint quarries do not occur. None of them, however, present any feature, except it be in the character of the stone, that is different from what may be observed in the two localities herein described.

A short explanation of the origin of flint deposits may not be out of place.

Certain microscopic organic bodies belonging to both animal and plant creation extract from the sea-water in which they exist small quantities of silica, which enters into their composition as lime enters into the shells of mollusks or the skeletons of animals belonging to a higher class. Most sponges also abstract from the water silica, which may be found in them in minute particles. On the death and decay of these organisms the silica is released and settles to the bottom. Being in the finest possible state of subdivision it forms a very compact mass which, when free from impurities, hardens into fine-grained chalcedony or flint. Should there be contained in it foreign substances of any sort the stone is correspondingly altered, and there may result all the different varieties of flint, chert, buhr, and similar stone, which is so abundant as compared with the purer kind.

It is essential in this method of formation that the water in which it has its origin should be free from currents, and containing a smaller proportion of salt than in the open ocean, otherwise the necessary forms of life will not thrive. These conditions can only be met with in a small gulf almost enclosed by land, or in a depression protected by shoals, and in either case receiving a constant supply of fresh water with silica in solution. In this way is formed most of the chalcedonic stone occurring in large deposits. Flint Ridge was thus made; we find the baser stone or chert around the edges of this deposit nearer to the old shore line, while the finer grain of the central deposits shows a body of water untroubled by currents and free from sediment. Moreover, the deposit is irregular in its bedding, being considerably lower in some places than in others, showing that it was laid down on an uneven bottom. The single blocks or boulders, lying in some places many feet above the main body of flint, are of later origin.

A second manner in which rock of this character may be made is by a process of substitution or petrifaction. A body soluble or subject to decay, being covered with water charged with mineral of any sort, will, under certain conditions, be changed from its natural form into one exactly similar in shape and size agreeing in composition with the mineral solution in which it is immersed. As each particle of the original substance is removed it is replaced by a particle of the dissolved mineral; and after a time the entire body is thus changed. In this way are formed petrified forests, silicified wood, and the many fossil remains that have been converted into flinty rock.

Still a third method in which such stone is formed is by deposition. Water settling into a cavity and evaporating must deposit all the solid matter contained in it. If this be repeated a sufficient number of times the cavity will be filled; and should the deposits thus made be of matter held in solution and not merely carried mechanically, they may harden into a stone much more compact than that by which they are surrounded. Such is the origin of most agates, opals, and stones of that character. Should the evaporation be exceedingly slow crystals will be produced, their size and perfection depending upon the length of time allowed for their completion.

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38

PHILLIPS ACADEMY, ANDOVER, MASSACHUSETTS
DEPARTMENT OF ARCHAEOLOGY

BULLETIN IV

PART I

The Exploration of Bushey Cavern,
near Cavetown, Maryland

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PART II

Fort Ancient

The Great Prehistoric Earthwork of Warren County, Ohio

By
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PART I

THE EXPLORATION

OF

BUSHEY CAVERN, MARYLAND

BY

CHARLES PEABODY

EXPLORATIONS OF BUSHEY CAVERN

Bushey Cavern is situated in Cavetown, Washington County, Maryland, on the line of the Western Maryland Railroad, twelve kilometres[1] northeast of Hagerstown. The opening is on the western side of the line about twelve metres above the level of the track and about one hundred metres from the Cavetown station in the direction away from Hagerstown. The hill or ridge in which it is found has a major axis running generally north and south and is flat above; the valley to the east is about two kilometres wide and there bounded by the Blue Ridge Mountains.

These attain a height of from six hundred to seven hundred metres in the vicinity. The valley mentioned is part of the Cumberland Valley commencing to the north in Pennsylvania and continued southwestward by the famous Valley of Virginia across the Potomac river.

It is rich in grain and fruit, picturesque to a degree attained by some French landscapes and abounding in associations connected with the war between the States. The altitude of the valley at Hagerstown is one hundred and seventy-six metres.

Much of the fertile soil rests on the Cambrian-Silurian "Shenandoah" limestone formations in which caves and rock-shelters are usually found.

Immediately south of Bushey Cavern is a large limestone quarry; the officers and men connected with it extended all aid and courtesy in the furtherance of the exploration; tools and time were cheerfully afforded.

The Cavern receives its name from Mr. F. M. Bushey, of Cavetown; he was at the time in control of the land in which it is situated, and freely offered the privileges of excavation.

It consists of a chamber or rock-shelter, behind which are a vestibule and narrow passage running westward.

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[1] The metric system is used throughout the article.

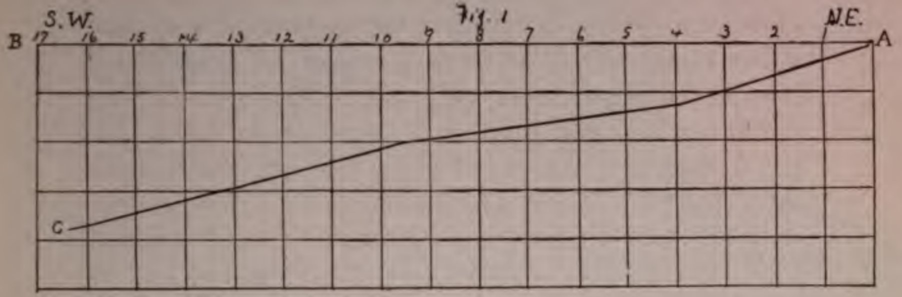
The surface within the rock-shelter was divided by rows of stakes at intervals of one metre; these rows were at right angles to each other; the numbered stakes ran inward from the entrance from zero upward and the lettered stakes from south to north beginning with A.

STATISTICS FOLLOW

Orientation of cavern; i.e., direction of line at right angles to the line of the entrance.	East. 10° north.	
	M.	Cm.
Length of entrance under overhanging rock . . .	21	
Length of main chamber measured parallel with the line of the opening.	41	
Depth of main chamber measured at right angles to the line of the opening.	29	
Length of passage at the rear of the cavern (approximate)	200	
Height of roof above floor. On the line of the opening at stake A. . . .		40
" " " " " " " " C. . . .	2	40
" " " " " " near " L. . . .	2	70
" " " " " " " " V. . . .	0	00
Height of roof above floor. In the interior. At stake K—13	4	75
Greatest height. 8 metres southwest of stake K—13 . . .	6	50

On entering the ground is found to slope rapidly downwards towards the west; two diagrams of this are given (figs. 1 and 2).

Fig. 1. (Main chamber, front portion.) Line AC represents the slope of the surface from A (at stake H–0 on the map) southwestard to C (near stake G–14). The fall is 3 m. 35 cm.



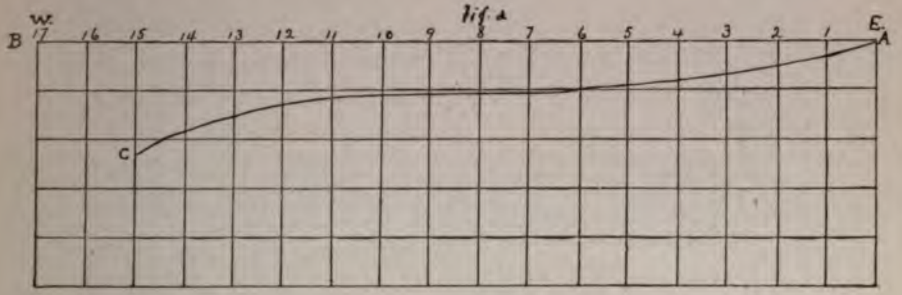


Fig. 2. (Main chamber, rear portion.) Line AC represents the slope of the surface from A (near stake T–16 on the map) westward for 15 metres. The fall is over 2 metres.

There is also a fall from north to south within the main chamber.

Near stake S–16 is a stalagmite, isolated and much larger than other similar formations within the Cavern; it is 2 m. 50 cm. high, reaching to within 68 cm. of the roof and its elliptical base has a major axis of 2 metres.

Against the southwestern wall lies the so-called "Cascade", an involved series of stalagmitic cups formed of the lime held in solution by the dripping water.

The slope formed by these ridges has a fall of 2 m. 85 cm. in 6 metres. The "Cascade" is a feature unique in cave formation so far as the experience of the author goes.

Near stake W–3 excavation disclosed an opening in the north wall of the Cavern. This leads to the so-called "Bear-Den", a circular recess 2 metres in diameter and 1 m. 35 cm. in height.

The entire "Bear-Den" is 2 metres below the level of the undisturbed stratum of ashes and soil outside in the main chamber. There is no reason to doubt the existence of many such recesses, passages and crevices, which, if excavated, would alter considerably the contour map of the Cavern.

At the time of the exploration the floor of the main Cavern was partly a hard stalagmitic formation (generally confined to the rear) and partly a deposit of ashes, vegetable mould and decomposed limestone. This was mingled with pebbles and blocks of limestone attaining occasionally a weight of hundreds of kilogrammes. Blasting with small charges of dynamite was required for their removal.

The stalagmitic floor, so far as observed, varied from a few centimetres in thickness to more than fifty. It was hardly found east of stake 15.

Previous exploration of the Cavern has been made at a number of times. In 1903 Mr. J. D. McGuire, of Washington, explored certain sections in the months of May and September; these are roughly marked and entitled McG. on the map. In addition the work done by the late Mr. F. H. Cushing, by Mr. F. E. Bushey and others should be mentioned.

The explorations here considered were begun by Mr. W. K. Moorehead on May fifth, 1905, and were continued by himself and the author until May twenty-ninth. A working force of eleven or less was employed, who not only labored according to direction, but took an intelligent and helpful interest. The specimens found are in the Department of Archaeology, Phillips Academy, Andover, Massachusetts, under whose auspices the expedition took place.

The digging in the Cavern may be summarized as follows:

Pit or Trench	Position	Depth		Remarks.
		M.	Cm.	
1 or A.	C to F 1 to 4	2	60	At D — 4, 60 cm. down, charcoal.
2 or B.	${}^{B}/_{C}-{}^{16}/_{17}$ to near A—17		60	55 cm. down, charcoal, animal bones and pottery.
3 or C.	${}^{Y}/_{Z}-{}^{14}/_{15}$ to Y—${}^{5}/_{6}$ in north N — 16 to M — 11 in south Carried under wall of cavern to the north and east.	1	77	At Z — ${}^{10}/_{11}$ 1 m. 77 cm. down, bone awl or pin. At Z — 12, 1 m. 7 cm. down, bone awl. At W — 7, 75 cm. down, animal bone embedded in rock. At ${}^{Y}/_{Z}$ — 9, 1 m. down, rock composed of breccia, containing stones, charcoal and bones. Under this additional animal bones. At B — 7, 80 cm. down, under north wall, animal bone embedded in rock. At ${}^{Z}/_{AA}$ — 9, about 1 m. 40 cm. down, red (cave) earth. At X —10, 85 cm. down, bone awl or pin. At AA — 7, about 1 m. 70 cm. down, fragment of stalagmite. At Z — 10, 1 m. 50 cm. down, projectile point or knife. Some pottery was also found.
4 or D.	Near A —${}^{8}/_{9}$			Soon discontinued.
5 or E.	S—6 to T—2 in north K—9 to K—5 in south	3	60	${}^{S}/_{T}$—5, 1 m. 40 cm. down, fragment of pottery.

<table>
<tr><th rowspan="2">Pit or Trench</th><th rowspan="2">Position</th><th colspan="2">Depth</th><th rowspan="2">Remarks.</th></tr>
<tr><th>M.</th><th>Cm.</th></tr>
<tr><td>6 or F.</td><td>An ellipse near $^{L}/_{M}$—20
4 m. 80 cm. north and south
3 m. 10 cm. east and west</td><td></td><td></td><td>Known as "Bushey Pit"; begun as a trial trench by Mr. F. E. Bushey, continued to display the stratification of the cavern.
The cross-section follows:
<table>
<tr><th></th><th>M.</th><th>Cm.</th><th></th></tr>
<tr><td>1</td><td>0</td><td>34</td><td>Vegetable earth.</td></tr>
<tr><td>2</td><td>0</td><td>20</td><td>Dark stalagmitic floor with charcoal.</td></tr>
<tr><td>3</td><td>0</td><td>30</td><td>White stalagmite floor.</td></tr>
<tr><td>4</td><td>0</td><td>25</td><td>Red and black stalagmitic formation.</td></tr>
<tr><td>5</td><td>1</td><td>10</td><td>Red clay ("cave earth").</td></tr>
<tr><td>6</td><td>0</td><td>10</td><td>Yellow or red clay.</td></tr>
<tr><td>7</td><td>0</td><td>8</td><td>Gray clay.</td></tr>
<tr><td>8</td><td>0</td><td>10</td><td>Yellow clay.</td></tr>
<tr><td>9</td><td>0</td><td>10</td><td>Black earth.</td></tr>
<tr><td>10</td><td>0</td><td>70</td><td>Yellow clay.</td></tr>
<tr><td></td><td>3</td><td>27</td><td>Total depth.</td></tr>
</table>
The walls contained numerous large stones. No bone, nor chipped flint nor charcoal was encountered below stratum 3.</td></tr>
<tr><td>7 or G.</td><td>W — 3 and north eastward</td><td>1</td><td>35</td><td>Known as the "Bear-Den".
There is a narrow entrance and an interior circular chamber. It contained rocks, breccia, loose earth and animal bones, worked and unworked.</td></tr>
</table>

The bones from the cave have been examined through the kindness of Mr. C. C. Willoughby and Dr. W. C. Farabee of the Peabody Museum, Harvard University. They include bear, deer, raccoon, woodchuck, and probably porcupine.

During the work visits were received from Professor W. H. Holmes, Chief of the Bureau of American Ethnology, and from Mr. J. D. McGuire of Washington, whose experiences, enthusiasm and advice assisted the progress of the explorations most materially.

At the end of the rear passage is a pool currently reported to be "bottomless". Mr. Moorehead, with considerable difficulty, compassed the transportation of a boat through the passage for the examination of this pool. It was found to be about 30 metres in length, 6 metres in width and about 2 metres deep.

The inhabitants of the Cavern before the white men were probably members of the Shawnee tribes of Indians.

In addition, several small trenches were dug to the west of the large stalagmite; the results were negative as were those of a trench sunk in the inner passage, 24 metres back of the west wall of the Cavern. This was 1 m. 70 cm. × 90 cm., and 1 metre deep.

The stalagmite floor through which "Bushey Trench" was driven varied in thickness. At the top it is black from vegetable mould, in the middle it is cream-white and very pure; below this it becomes more and more red until it is indistinguishable in color from the red "cave earth" which it covers. At the position given above in the section it had a total thickness of 75 cm.; in spite of being in the aggregate very hard, it is quite friable in fragments.

As the upper part forms a breccia it is not surprising that it contains evidences of the human occupation of the Cavern. Similar breccia with charcoal, animal bones and chipped flints abounded about the sides of the Cavern and in the Bear Den.

From the middle or white stratum of the stalagmite floor no bones nor flint were taken and the presence of charcoal is doubtful. Below this the explorations found no traces of human or animal occupation contemporary with or previous to the laying down of the floor.

At stake L–19 ("Bushey Trench"), however, in a breccia red (not black) charcoal was found at a depth of 19 cm. below the surface of the floor.

Artifacts from the Cavern are rare: bone awls and pins of various types are the more numerous of the finished implements. (Cf. Pl. VII.) In the low-lying fields adjoining were found numbers of knives and projectile points of chipped stone (Cf. Pls. V and VI).

The limestone quarry to the south gave opportunity for studying the red "cave earth" or decomposed limestone to a considerable depth; many fossilized, or semi-fossilized animal bones were observed in it. Among these is a specimen, as yet incompletely identified, but not improbably belonging to the Equus complicatus (this is through the kindness of Mr. J. R. Gridley of the Department of Geology, of the Smithsonian Institution).

PLATE I.

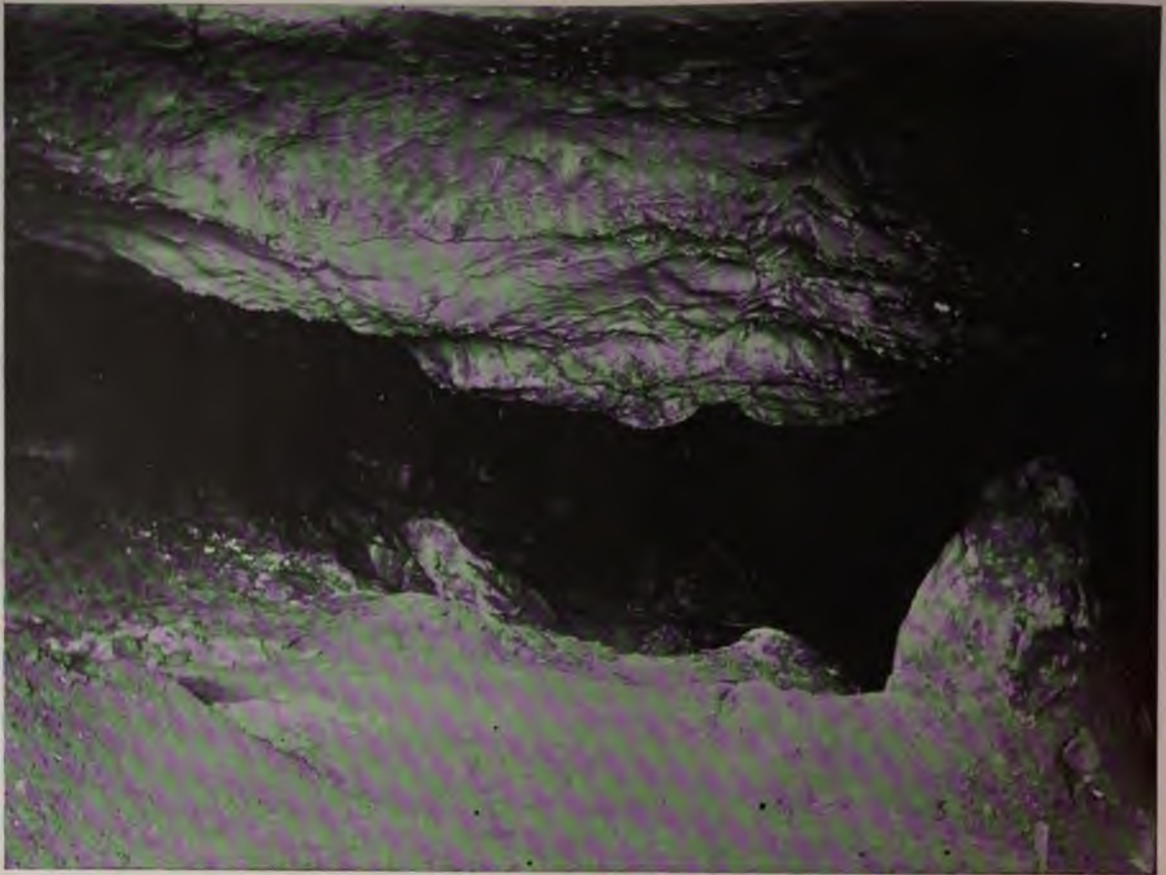
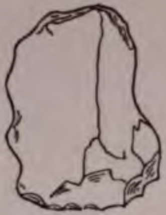


PLATE III.

PLATE IV.



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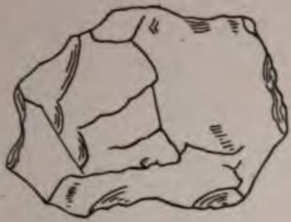

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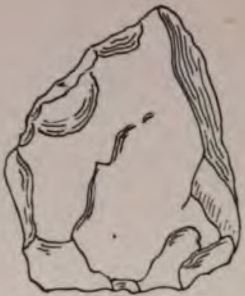

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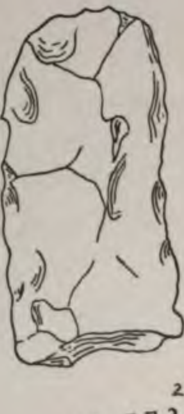

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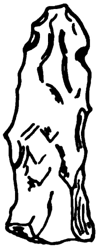

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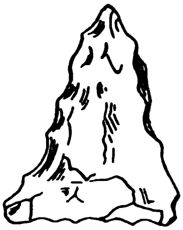

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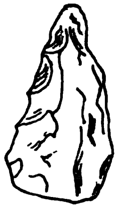

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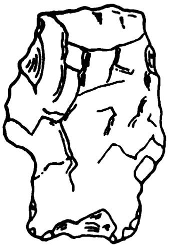

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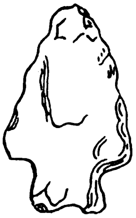

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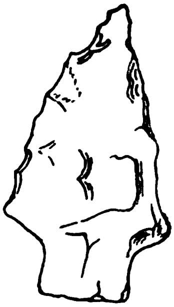

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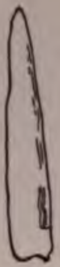
PLATE VI.



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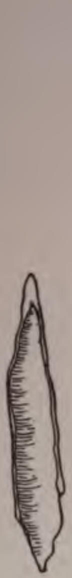

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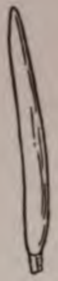

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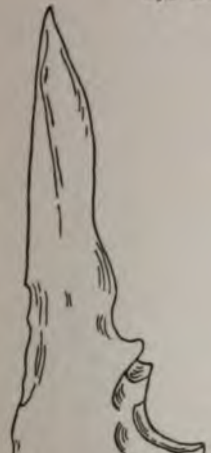

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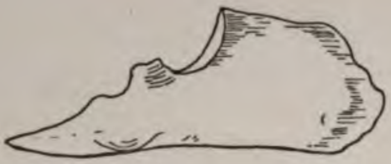

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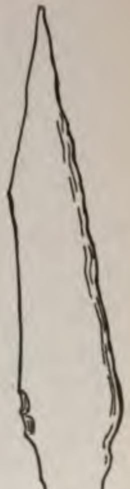

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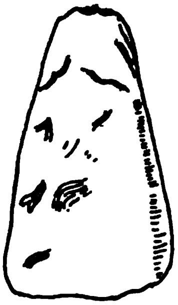
PLATE VII.



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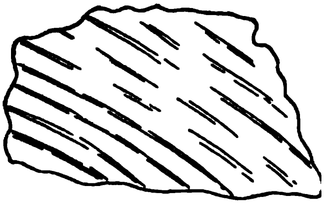

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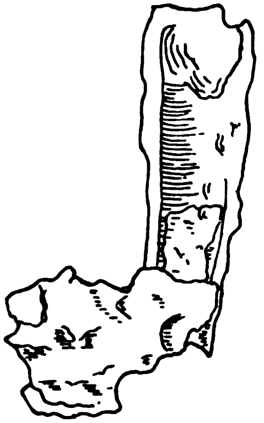

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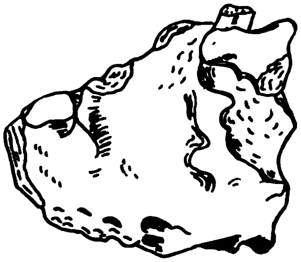

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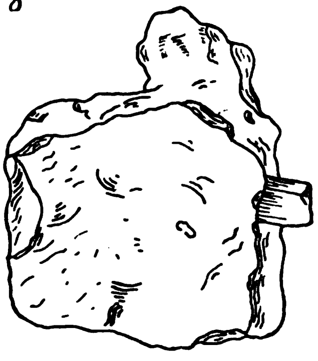

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PLATE VIII.

NOTES TO THE MAP OF BUSHEY CAVERN

———————— = Approximate line of union of interior deposit with the wall.

– – – – – – – – = Opening under overhanging rock.

– —— – —— = Rough contours of Mr. McGuire's digging.

* * * * * * * = Rough contour of trenches of 1905.

DESCRIPTION OF PLATES

PLATE I.

The eastern section of the Cumberland Valley, looking northeast from near the limestone quarry, from a water-color by Professor W. H. Holmes, kindly presented by him to the author.

PLATE II.

Bushey Cavern, Trench F, or "Bushey Trench"; from the east, showing stalagmitic floor.

Height of boy = 63 cm.

PLATE III.

Bushey Cavern. Interior, showing large stalagmite.

PLATE IV.

Bushey Cavern. "Cascade" of stalagmitic cups.

PLATE V.

Vicinity of Bushey Cavern.

Knives of stone; oval, roughly circular and oblong.

PLATE VI.

Bushey Cavern and vicinity.

Projectile points or knives of stone. No. 41591 is from Trench 3, Z — 10, 1 m. 50 cm. down.

PLATE VII.

Bushey Cavern.

Pins, awls and perforators of bone. All from within the cavern.

PLATE VIII.

Bushey Cavern.

Celt from Trench 3, about 75 cm. down.

Fragment of pottery from Trench 3, 1 m. 40 cm. down.

Fragments of breccia, including animal bones, stones and charcoal.

N. B.—All specimens in the plates are of one-half size.

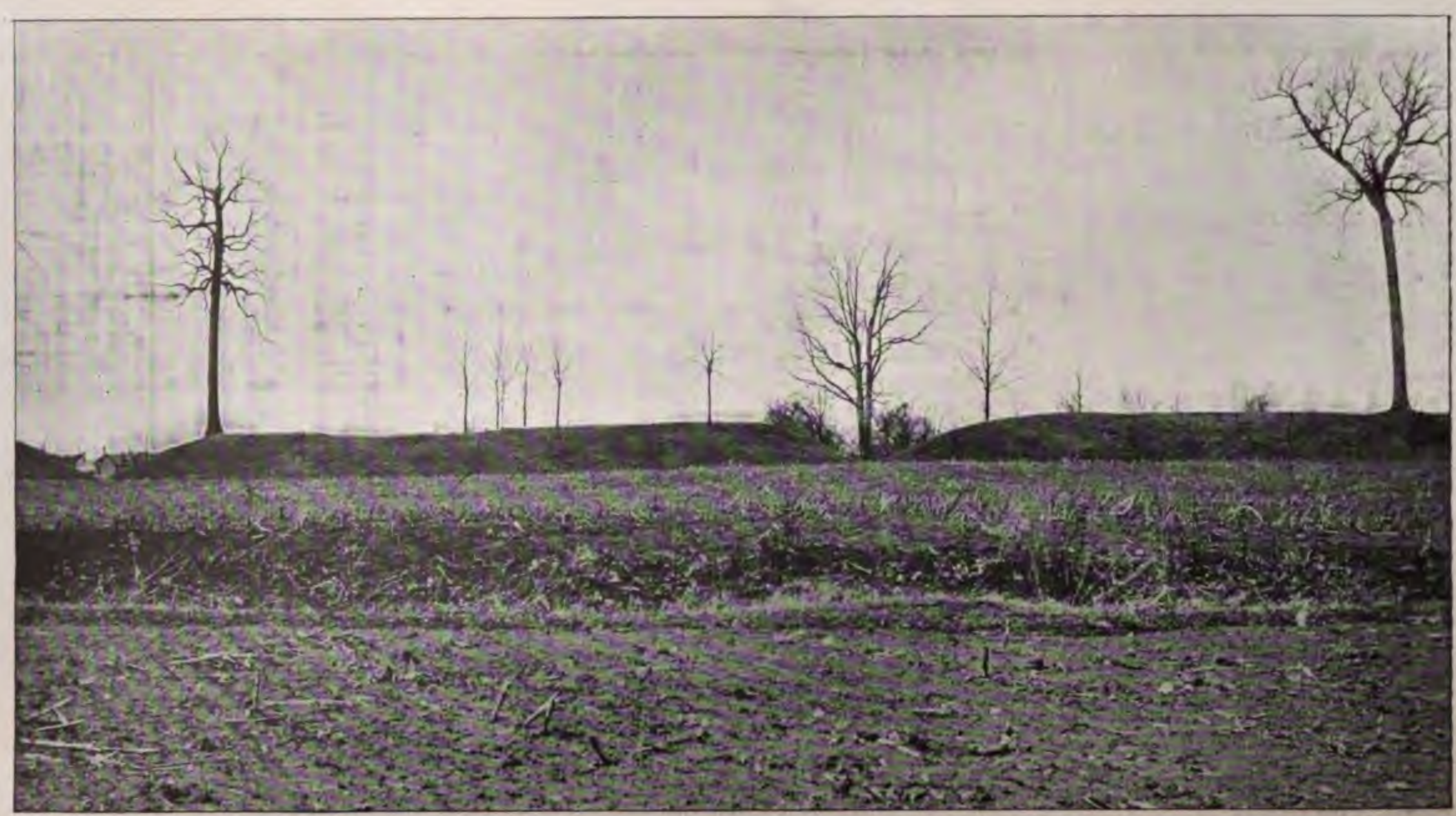

PLATE I.
A Distant View of Part of East Wall of New Fort. Camera outside of Embankment, 250 yards distant and looking West.

PART II

FORT ANCIENT

THE GREAT PREHISTORIC EARTHWORK

OF WARREN COUNTY, OHIO

BY

WARREN K. MOOREHEAD

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PHILLIPS ACADEMY
Andover, Massachusetts

ILLUSTRATIONS

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CHAPTER I

THE HISTORIC PERIOD AT FORT ANCIENT.

In preface to a detailed description of the various embankments, mounds and camp sites, it is well to place on record how Fort Ancient came to be preserved as a park by the State of Ohio. For although most persons are aware that the State has come into possession of several remarkable earthworks of pre-Columbian times, the facts leading up to such worthy action, may not be generally known.

Those of us who lived near the place had heard more or less concerning it. Mr. North of Old Town—the site of Old Chillicothe, three miles north of Xenia, in Greene County—used to relate to interested boys stories of adventure with Indians handed down from his father, who had heard them from the lips of Simon Kenton, the friend of Daniel Boone. One of these mentioned that Kenton—who spoke Shawano well—said the Indians had no tradition of the builders of Fort Ancient, but that they (the Shawanoes) visited the place en route to the Ohio and did homage to the spirits of its makers.

Xenia is twenty-two miles north of Fort Ancient, and in the early eighties, after the publication of Professor Short's "North Americans of Antiquity", there was much interest manifested in the earthworks of the Little Miami Valley. Picnic parties to Fort Ancient were organized every summer and as a boy in company with older persons, I occasionally visited "the Fort". In those days, as at present, Fort Ancient was a favorite resort for such excursionists. Apropos of this it is proper to state that in the early summer of 1891, 800 persons visited Fort Ancient in one day. This was the occasion of the opening of some thirty stone graves, and citizens from Cincinnati, Columbus, Dayton and other distant points were present. Local interest in Fort Ancient exceeded that of the Serpent Mound, which was more difficult of access. The place had a fascination for me and I spent many happy days thereabouts collecting specimens.

In the summer of 1887 Mr. Clinton Cowen, C. E. spent a week with me at Fort Ancient. We dug in the village site along the banks of the Little Miami river. The next winter (January 8, 1888) I wrote an article for the Ohio State Journal, urging the preservation of Fort Ancient. This article was copied extensively throughout the state, aroused considerable interest, and numerous persons wrote me. Mr. A. A. Graham, at that time Secretary of the Ohio State Archaeological and Historical Society, asked me to call upon him at Columbus and the next spring he and I visited Fort Ancient.

Late in February, 1889, Mr. Gerard Fowke and myself met in the State House at Columbus where we agreed upon the survey and exploration of Fort Ancient. Mr. Alfred Cowden, the principal owner of Fort Ancient at that time living at Morrow, and Mr. and Mrs. Dunham and others of Lebanon, heirs in the Fort Ancient estate, were visited by us. Mr. Cowden and the other owners were quite willing to cooperate with the proposed survey and gave us unlimited leave to excavate, survey, map and photograph. All specimens found were to be my property as the survey and exploration were in the interest of no institution.

June 8th arrangements were made with Mr. Robert Clarke, head of The Robert Clarke Company, Publishers at Cincinnati, to issue the book "Fort Ancient" as soon as the explorations were completed. This firm was founded in 1858, succeeding the house of H. W. Derby & Co. The Derby Company was one of the earliest publishing houses in the West. It and the Robert Clarke Company made a specialty of history, science, biography, archaeology, etc. Mr. Clarke's private collection of first editions on America, and library of early American history, now in the University of Cincinnati, is one of the finest extant. Mr. Clarke was more than a publisher; he knew much concerning archaeological matters and was an authority on Ohio Valley bibliography. He died in 1899.

He impressed on me the necessity of a thorough exploration—that Fort Ancient was now a jungle and that we would be compelled to expend a large sum of money in

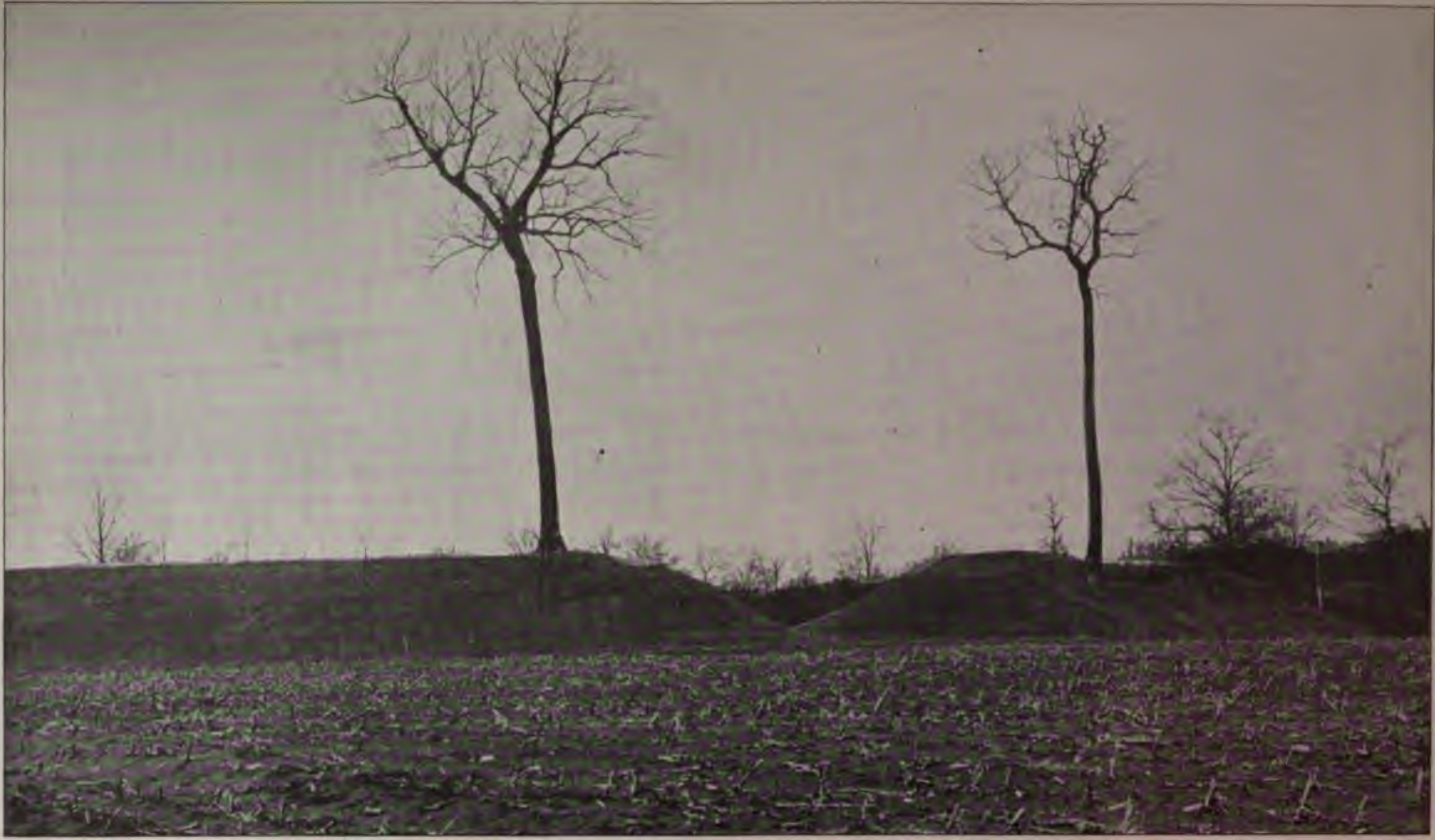

PLATE III.
Rear View of Portion of East Wall of New Fort. Camera outside of Fort, 100 yards distant, looking West.

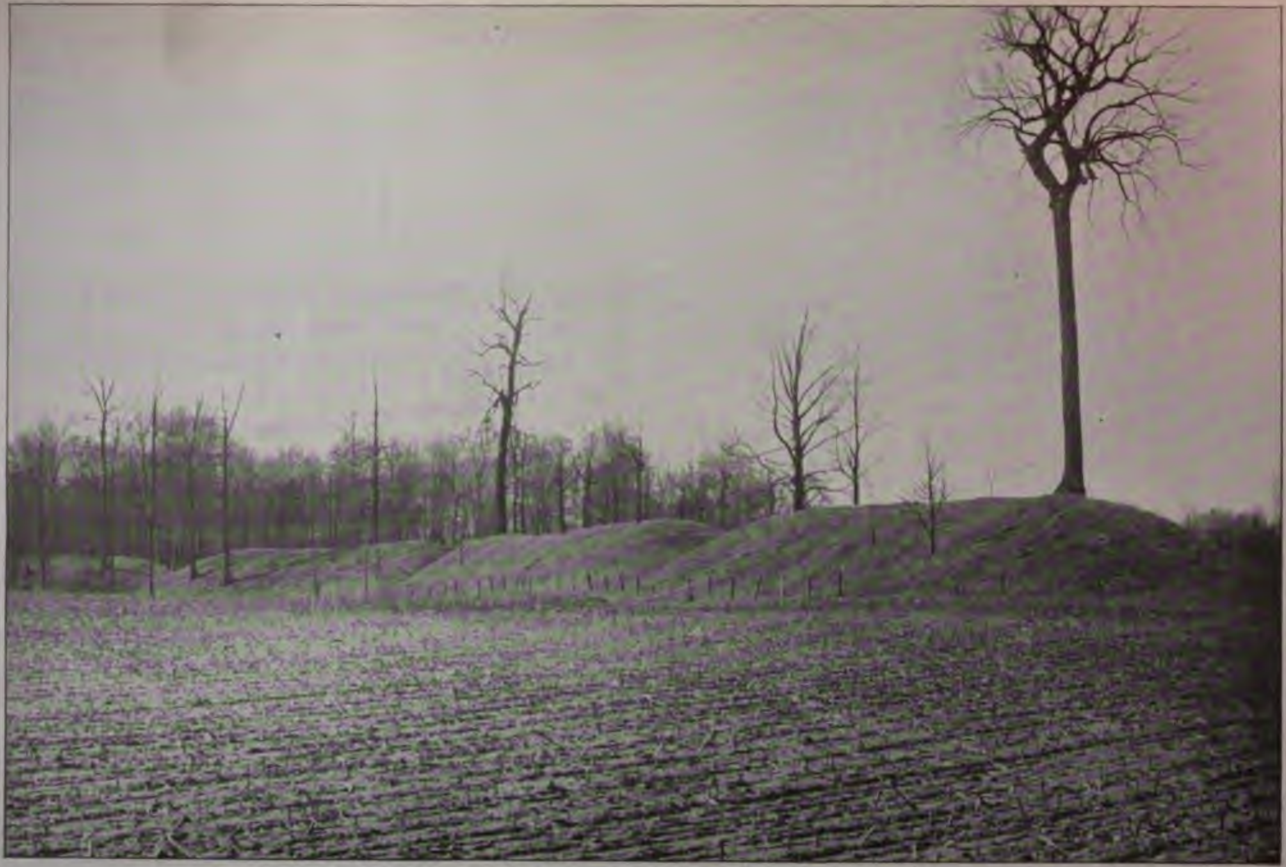

PLATE IV.
Part of Wall of New Fort. Camera outside of East Wall, nearest, and looking South. 1000 feet of embankment shown.

order to examine the place carefully and systematically; that we must make hundreds of accurate measurements, for other men might attempt to upset our calculations—a prediction afterward verified. To Mr. Clarke we were indebted for many wise counsels and practical suggestions.

The force employed varied from seven to fourteen persons. Besides Messrs. Fowke and Cowen, Mr. W. W. Ralston acted as stenographer, and Mr. Strong of the Cincinnati Camera Club was photographer. Some of my workmen had dug for me during brief field work in '87 and '88. Three of them went on the Hopewell survey. These men had become quite skilful and could remove skeletons which at first glance seemed too frail to be handled. Decayed skeletons they worked about with hand trowels and whisk brooms, brought the bones into relief by cutting away the earth underneath, whitened the bones so that there might be sufficient contrast between the skeletons and the clay. In some photographs of field work the bones do not show distinctly, because the skeletons are of the same color as the clay. This can be avoided by careful work and whitening the bones as stated above.

The collection made in 1889 was placed in the Smithsonian Institution where my collection had been exhibited for some time. In '91 and '92, a part of my collection was bought by the Smithsonian Institution, but the greater part of it—including the Fort Ancient material—was exhibited in Orton Hall, Ohio State University, when I was appointed curator of that museum March, 1894. Part of the Fort Ancient collection was bought by Mr. F. W. Parker of Omaha, but the major portion of it went to Columbus as stated above.

Early in 1891, Prof. F. W. Putnam, Chief of the Anthropology, World's Columbian Exposition (Chicago), sent for me to visit him at Cambridge. At that time Dr. George A. Dorsey, post-graduate student in Harvard and an old college friend of mine, was appointed to carry on explorations in South America for the Exposition. He and I were in consultation together with Prof. Putnam during some days. The Professor appointed me an assistant to explore various remains in Ohio. He wished to make a relief map of Fort Ancient such as had been made of the Serpent Mound from Mr. Cowen's survey of that structure in 1890. I told Professor Putnam that additional cross sections, various levels and measurements were necessary in order to furnish sufficient data, but that a re-survey of the walls of Fort Ancient was a needless expense. However, Professor Putnam wished the place re-surveyed and accordingly it was done. Mr. George Little, a graduate surveyor, and Mr. John Munger, assistant, chain and axe men were employed and the whole work re-surveyed in the early summer of '91. Three months were consumed in making an exhaustive re-survey. The total length of the walls was given by Cowen and Fowke as 18,712.2 feet. Little and Munger surveyed from points independent of those established by Fowke and Cowen and the total variation was less than ten inches. This is remarkable when one considers the irregular walls and the difference of opinion which must naturally arise as to where the gateways end or begin. The second survey emphasizes the accuracy of both surveys and that a subsequent survey of Fort Ancient would be an inexcusable waste of time and money.

For several years it has been my desire to bring within one volume the complete surveys of 1889 and 1891, together with all that has been observed by other investigators at this interesting and remarkable place. Such a publication would permit me to somewhat modify conclusions or observations made in '89, '90, '92 and '95. Again, certain statements or deductions may be put forth more strongly and better substantiated than in the original publication.

In this Bulletin I have made use of about a fourth of the original plates of the book "Fort Ancient". In many of these the language has been changed, others where measurements are given and the text relates to observations as to walls, moats, terraces, etc., are presented as they were published in the original book. I am quite aware that the chapters devoted to the embankments themselves, and kindred subjects, make very dull and tedious reading, but in order to understand the place thoroughly and just what it means, he who is interested in archaeology should follow the text carefully. General readers will be interested only in the conclusions and final observations.

Mr. Webster Williams of Fort Ancient, took eleven of the photographs during the winter of 1905, when conditions were perfect. The specimens are from the Andover collection (found by Mr. Clifford Anderson) and from my own collection now owned by the Ohio State University.

I am indebted to Mr. W. C. Tichenor of Dayton, Ohio, for permission to reproduce from his "Guide to Fort Ancient" the view of the Valley (Plate XXI) and Plates VIII and IX; also to Professor W. C. Mills for suggestions. Those who cooperated with the surveys of '89 and '91 have been thanked in previous publications.

Comments on the survey for Professor Putnam are unnecessary but I have reprinted the record of the exploration of village sites flanking the Little Miami river. This work was done for Professor Putnam and all the specimens found, together with numerous skeletons, were shipped to Chicago. It has been thought best to reprint some portions of explorations along the East Fork of the Little Miami and of Clinton County. These places present Fort Ancient culture and are very interesting on that account.

THE PURCHASE OF FORT ANCIENT

Although it is not the writer's purpose to present all the details concerning the purchase of Fort Ancient by the State of Ohio, the essential facts are herewith given.

During the course of the 1889 explorations, hundreds of people visited the Fort. The Cincinnati papers sent representatives and numerous interviews were published. The next winter, the Hon. Jesse N. Oren of Wilmington, and representing his district in the Ohio State Senate, introduced a bill to purchase the fortification. This bill passed April 28th, 1890. Through an oversight only half of the enclosure was purchased and Senator Oren introduced a second bill, which passed the Senate but was omitted in the

Report of the House Committee. April 16th, 1906, the legislature passed a bill authorizing the purchase of the remainder of Fort Ancient.

The following extracts from a letter written by him April 10th, 1908, to the author of this Bulletin are self-explanatory: —

* * * * "I remember you very well. I visited Fort Ancient while you were making the survey. Later, you gave me a copy of your book.

"I was elected to the Senate in 1889. After my election, the importance of preserving Fort Ancient was first called to my attention by Prof. Jonathan B. Wright of Wilmington College, who said: 'The State ought to own Fort Ancient'. I had never given the subject much thought, but after reading your book I was more and more impressed with the importance of preserving these prehistoric works.

"With a view of carrying out the idea, I introduced a bill and succeeded in having it passed, providing for the purchase by the State, of the grounds upon which the most important part of the Fort is built; putting the Fort under the control of the Archaeological and Historical Society of the State.

"The importance of Fort Ancient as a prehistoric work was never fully realized until the publication of your book in 1889. You have rendered an invaluable service to the science of archaeology in what you have contributed to the preservation of this wonderful work.

I am, very respectfully yours,

"JESSE N. OREN."

In answer to a letter of inquiry, a communication was received from Professor J. B. Wright, dated April 21st, 1908. Professor Wright states that he took a party of friends to Fort Ancient in the fall of 1889. During the course of dinner, Mrs. Wright suggested that her husband speak to Senator Oren about the preservation of Fort Ancient. Thus it will appear that whether these persons were influenced by the 1889 survey or not, much of the credit for the purchase by the State of Ohio, is due to them.

Immediately after the first purchase, the State set about

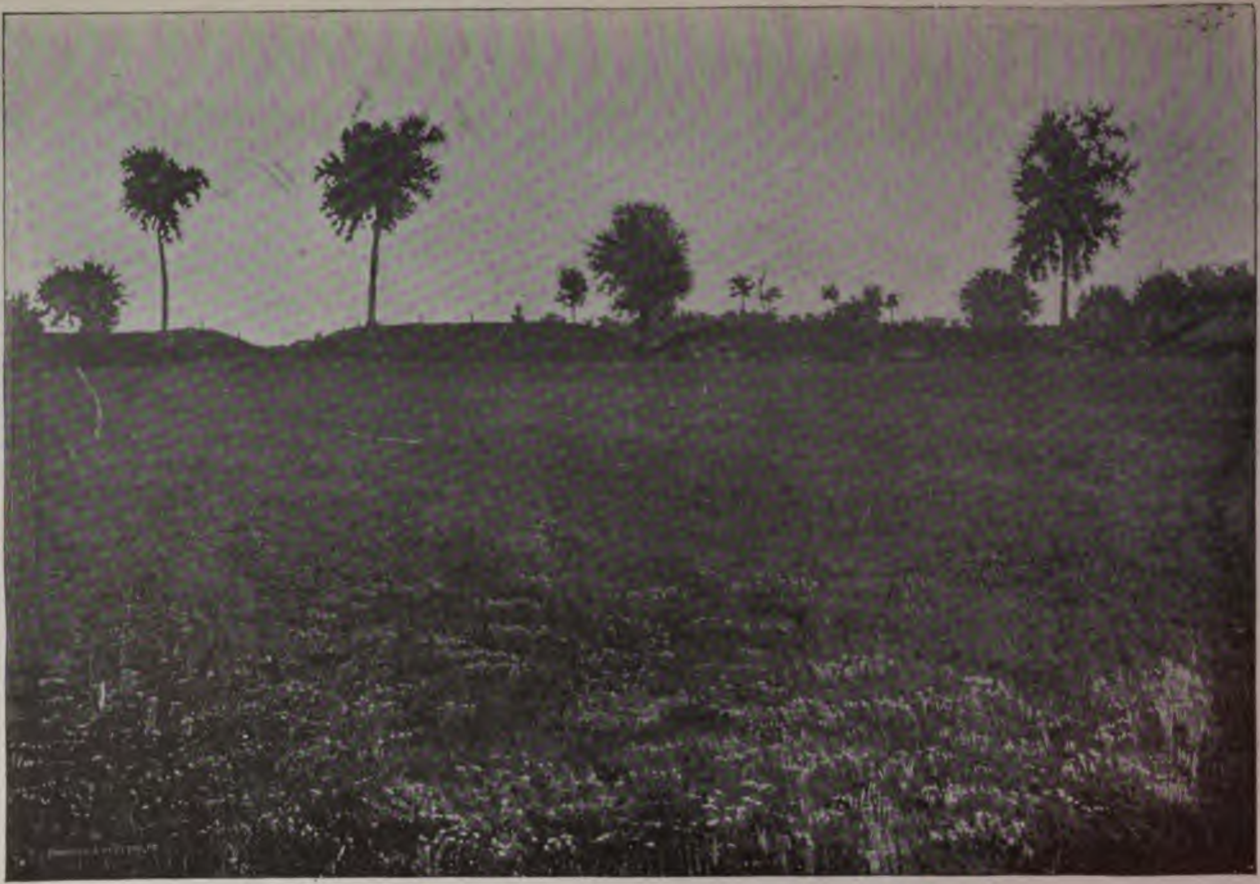

PLATE V.
View from inside of New Fort; camera looking East. Summer view of same walls shown in Pl. IV.

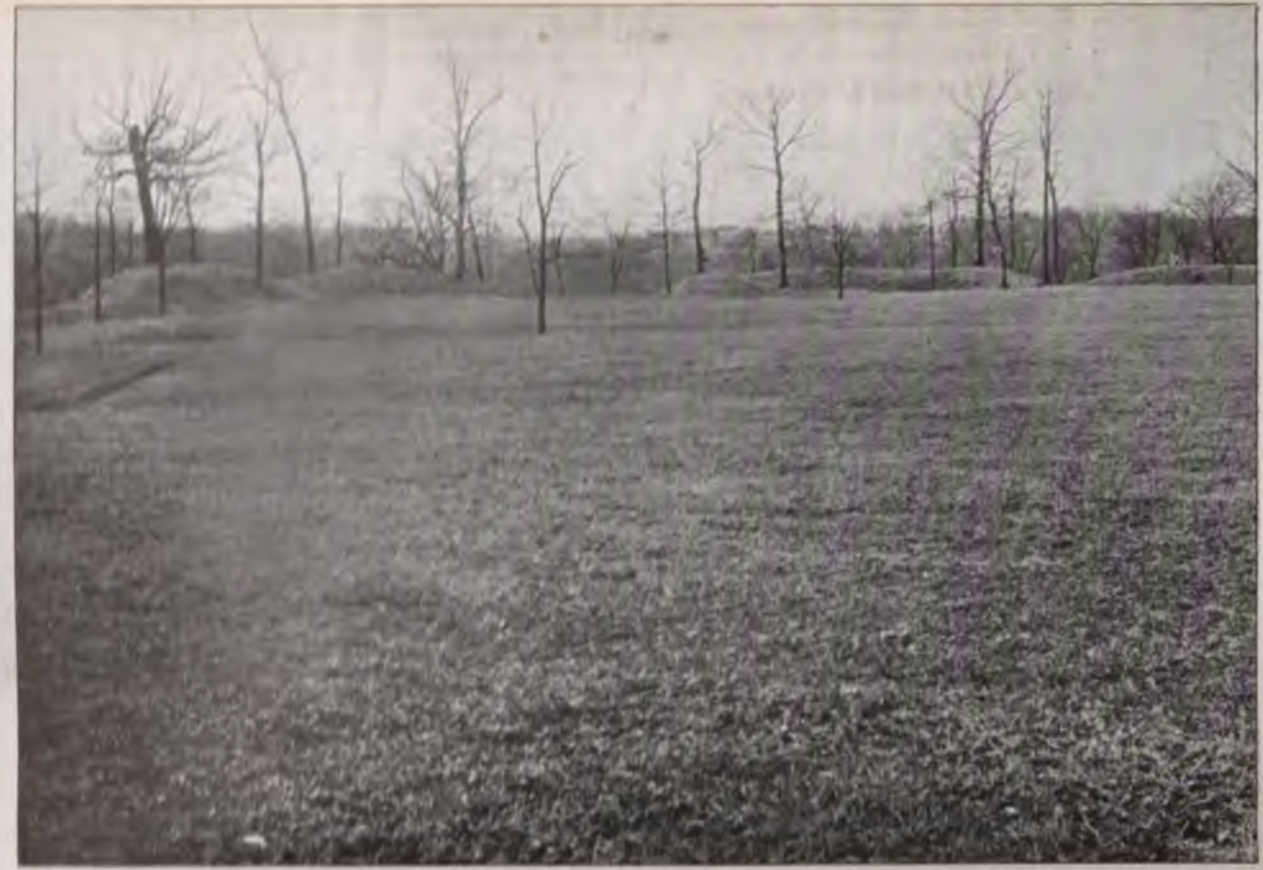

PLATE VI.
Within the New Fort, west side. Walls on the edge of hill overlooking the River.

improving Fort Ancient. The care of the work was given to the Ohio S ate Archaeological and Historical Society, and Mr. Warren Cowen was appointed custodian. He has held that office for fourteen years and improved the property greatly. The small, low mounds of 60 to 70 feet diameter have been restored slightly, by Mr. Cowen. The edges, constituting natural wash, have been thrown up and the mounds thus changed to 30 feet diameter and 6 feet height — the same kind of work was done by Professor Putnam at the Serpent Mound. Mr. Cowen resides on the spot in the original farm house, which has been remodeled for his benefit. A committee appointed by the Society has supervised the work of this custodian. Retaining walls have been constructed where washes occurred, underbrush has been cleared, some of the moats have been drained, and a pavillion for the accommodation of visitors was erected. The walls have been sowed with blue-grass. Altogether the Society has done an excellent work at Fort Ancient and is deserving of credit. Fortunately no "restorations" have been attempted, and the walls remain in their original condition.

At the time of the first purchase, Col. Van Horne, a gentleman interested in landscape gardening and to some extent in archaeology, visited Fort Ancient with a view to beautifying the place. While it is far from the writer's purpose to speak disparagingly of Col. Van Horne, if the truth is to be told, lovers of Fort Ancient will rejoice that the Colonel's plan of "landscape gardening" was not carried out. He did some grading on the edge of the ravine in the center of the North Fort (see point marked "house and barn" upon the map, Plate II). He informed me that this grading was a preliminary in the construction of a macadamized road entirely around Fort Ancient. The appropriation was not sufficient to complete his scheme, and the rains soon washed out the Colonel's road.

A bad gulley began to form back of the house, and had not brush been filled in, the break might have become serious. But, fortunately, no permanent damage resulted.

Col. Van Horne made no regular survey of Fort Ancient. His equipment consisted of a hand level and steel tape.

His researches were conducted alone and no force accompanied him. It is necessary to remark these facts, for he was requested to make a map of Fort Ancient to be hung in the State House, and an artist under his direction copied the map drawn by Messrs. Fowke and Cowen on an enlarged scale and for years it hung in the State House at Columbus. As no credit was given those of us who made the survey, I have always felt that Col. Van Horne did the survey of 1889 an injustice.

BOOKS ON FORT ANCIENT

On page 164 will be found a bibliography of Fort Ancient literature.

The first printed account of Fort Ancient that we have record of, is in the "Portfolio", published in Philadelphia, in the year 1809. It was described and a plan given in the "Pioneer", of Philadelphia, also in the year 1809. It was described and figured in Drake's "Pictures of Cincinnati", in 1815. Caleb Atwater, in 1820, in the "Transactions of the American Antiquarian Society," presents an intelligent account of the place and gives us a map. This was afterwards copied by Howe in his "History of Ohio". Atwater's description is quaint. Although he wrote before 1820, his remarks are more sensible than those of some recent authors. According to his description the walls have changed little since his day — an indication of their age.

Squier and Davis gave the best description of Fort Ancient that we have had previous to 1889. Locke's survey, copied by them, is fairly accurate.

Among recent publications upon Fort Ancient there is "A Guide to Fort Ancient", by Mr. W. C. Tichenor of Dayton, O. This is a neat pamphlet of 34 pages with nine illustrations. It is well written, accurate, and contains all needed information. It is the Fort Ancient "Baedeker", and we commend its perusal to visitors who would understand what they observe.

A more pretentious work, published this year, is "The Masterpieces of the Ohio Mound-builders", by the Hon. E.

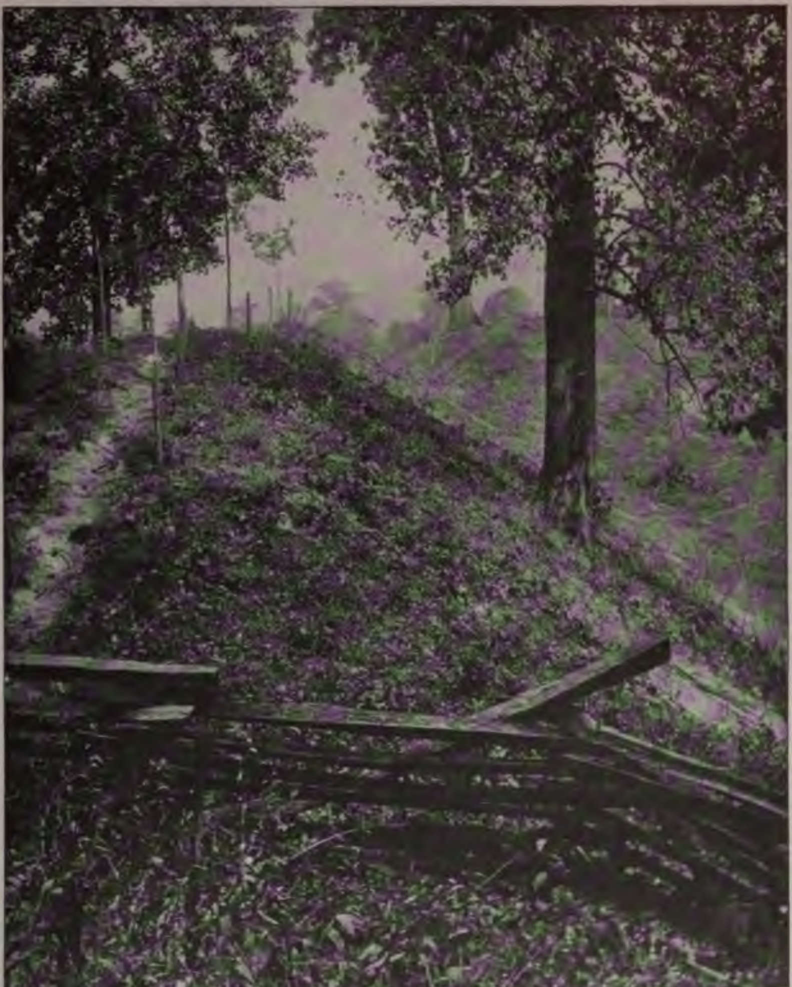

PLATE VII.
Top of the Embankment near Station 12, looking North.

O. Randall. Mr. Randall is secretary of the State Archaeological and Historical Society. In his book of 126 pages he gives numerous figures and interesting descriptions of the chief hill-top fortifications of the state. [illegible]6 pages are devoted to Fort Ancient. His narrative is popular rather than scientific, and his style quite entertaining. He quotes at length from the various surveys and descriptions of Fort Ancient, and thanks to his judicial training is able to examine and comment upon discrepancies in the observations of the archaeologists who have written about the Fort.

Both of these books present the "new Fort Ancient" — the attractive park instead of the former brush-covered plateau. Mr. Randall, during his many years as Secretary, has contributed more than anyone else to the bringing of Fort Ancient to its present state of beauty.

Dr. Cyrus Thomas published a brief account of Fort Ancient in the "Handbook of American Indians", issued by the Smithsonian Institution, 1907, page 469. The description exhibits a lack of familiarity with the place. Dr. Thomas has always underestimated the amount of labor expended by the builders of Fort Ancient.

When the survey of 1889 began work, it was clear to us that there had been no uniformity of terms in the many descriptions of Fort Ancient. Farmers residing near "the Fort" had always recognized two divisions, the New Fort and the Old Fort. These terms were entered upon our map, together with additional names.

New Fort.—The northern Fort; that portion of Fort Ancient lying north of the Crescent Gateway, or north of the Isthmus.

Old Fort.—The southern Fort; that portion of Fort Ancient south of the Great Gateway; the irregular part lying south of the Isthmus on the map.

Great Gateway.—The dividing mounds at the south end of the Isthmus, which are marked stations 103 and 285, and which separate the structure into the Old and New Forts. These stations are on their highest points.

Isthmus.—The narrow neck which divides the structure almost into halves.

Crescent Gateway.—The wing walls which run out from stations 306 and 89.

The space between these and the Great Gateway is known as the ***Middle Fort.***

A few names have since been added by the State, but the important places still bear the original nomenclature.

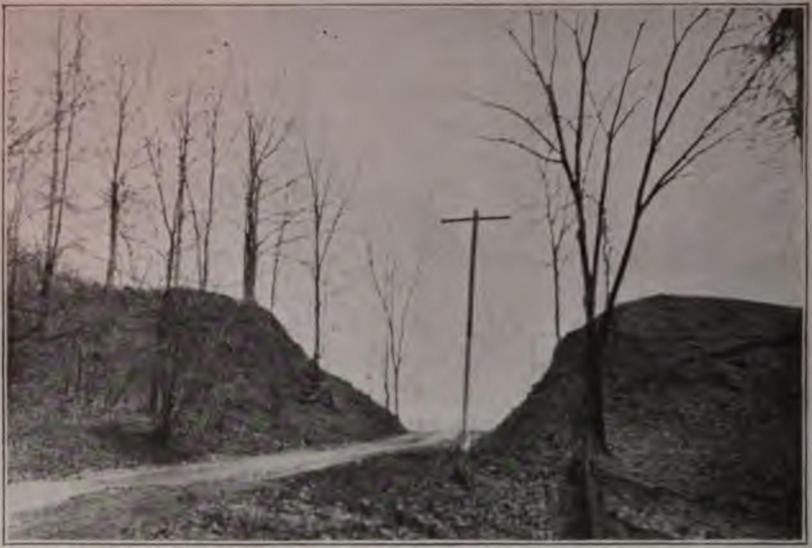

PLATE VIII.
Approach to Fort Ancient from the West. (From the Railway.)

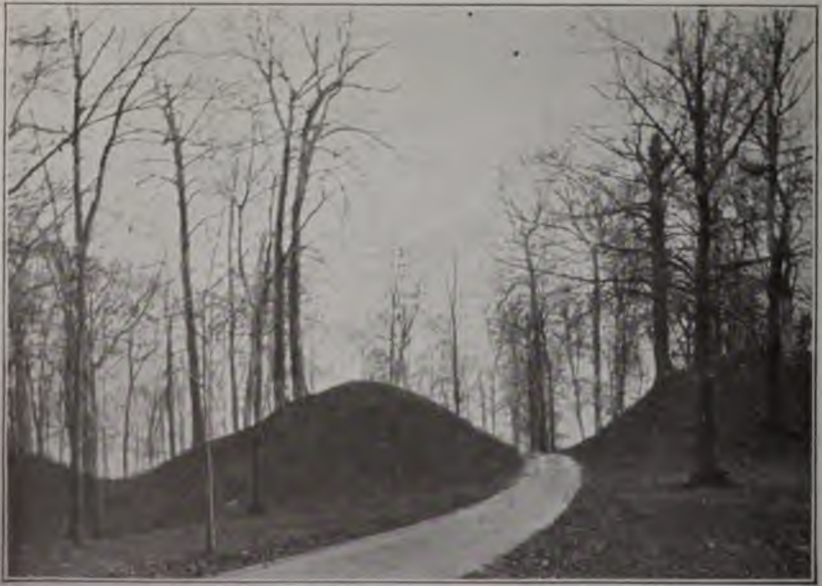

PLATE IX.
The Great Gateway; looking South. A Recent View.

CHAPTER II.

GENERAL DESCRIPTION OF THE FORTIFICATION AND THE SURROUNDING COUNTRY.

On a slightly rolling plateau in Warren County, Ohio, overlooking the beautiful valley of the Little Miami river, is situated Fort Ancient, the greatest of all prehistoric earthworks in the Mississippi basin.

This plateau is remarkable in its configuration. There is nothing precisely like it to be found in the Ohio valley, so far as the writer's observation extends. The plateau is cut up irregularly by ravines, and although none are of great length, yet all of them are precipitous and attain their depth within a few hundred yards from the beginning of their erosion. The fortification on one side (the west) follows the edge of this plateau and at most points on that side overlooks the river valley. The walls farthest away from the river are the straightest and also the strongest. Particularly is the strength observable at the eastern extremity, station 1 to 10 on the map (Plate II). The plateau near station 1 is 19 feet higher than the western portion, as will be observed if the reader consults Plate II and examines the two cross sections, one surveyed through the southern portion of Fort Ancient, and the other across the northern extension.

The valley opposite the New, or North Fort, is fully half a mile in width. Above and below the extent of the enclosure this valley narrows abruptly, and at one point—opposite the centre of the Old Fort—the hills come down to the water's edge on either side. The soil is quite fertile and excellent crops are raised yearly by resident farmers.

The Pittsburg, Cincinnati and St. Louis railroad (the Columbus and Cincinnati division) passes through the valley on the east side, following the curves of the river, and swinging around the South, or Old Fort. The Lebanon and Chillicothe turnpike passes through the New Fort at a point near its northern extremity. The station in the valley is named in honor of the earthwork, Fort Ancient, as is also the post-office.

The height of the plateau above low-water stage is 269 feet. The height of station 1 in the survey above low-water stage is 291 feet.

The height of the embankment at station 1 above the Atlantic ocean level is 941 feet. Although the distance around the inclosure (following the center of the embankment) is 18,712.2 feet, the structure is so irregular and crooked that a straight line drawn from station 389, in the northern portion of the fortification, to station 187, in the southern part of the earthwork shows a distance of but 4,993 feet, or less than one mile.

One leaves the railroad station and walks east, ascending the hill over the long and winding turnpike.

Near the summit, this road swings in a graceful curve to the north and then to the south, completing two-thirds of a circle. The view up and down the valley from the summit just before the pike passes through the embankment, is picturesque and commanding.

Although Squier and Davis in their survey of Fort Ancient drew the turnpike as curving toward the south and then north, old residents inform us that it occupies the same lines assigned it by the county surveyors who projected it.

Turning one's back on the view of the valley and proceeding eastward, one observes towering high above the roadway and extending in unbroken line to the right and to the left, a heavy mass of foliage. This is the first or western wall of the enclosure and the turnpike builders cut through it. The banks of the cut are quite steep and afford observers an opportunity to study the character of the walls, how it was built, and the percentage of loam, clay, gravel and stone contained in it. All walls of Fort Ancient, save at the east, before the purchase by the State of Ohio, were covered with a dense mass of underbrush, bushes, vines and saplings. The innumerable roots of this vegetation prevented washes from occurring and were a safeguard for preservation. In fact, the few gaps in the walls of Fort Ancient are due to the disturbing hand of the white man rather than to the elements. The State has since built retaining walls and prevented further erosion.

In the centre of the embankment on the left side of the cut, is a layer of flat limestone slabs extending horizontally for a distance of ten feet. These stones lie as if they had formed a rude wall, and although at present but three or four—or possibly five—stones are observed lying one above the other, yet it is not unreasonable to suppose originally they formed a wall of some height. Judging from outward appearance, the stones are worn, but that may be due to atmospheric conditions before the stones were placed in the wall. Limestone disintegrates rapidly when left in the open, as well as in running water. The roots of a small tree have held the stones in place. These slabs range in weight from ten to sixteen pounds and are about six feet from the base of the embankment and lie to the left of the center.

Plate VIII, page 46, illustrates the entrance of the turnpike into the New Fort at this point.

After one has passed through this cut in the embankment, one finds himself on the great plain enclosed in the area of the New or North Fort. The embankments on the east side are the most imposing, and the highest of any found throughout the structure. Attention is called to Plates I, III, IV, and V which present views of this stretch of embankment. It will be observed that some of the photographs have been taken in winter and others in summer.

Few visitors to Fort Ancient approach it from the east. The majority of those who spend a day—or even a few hours—in an inspection of this wonderful place arrive by train from Cincinnati or Columbus, or drive over from Lebanon. While the view which suddenly breaks upon one's sight after entering the enclosed plain through the cut in the turnpike is interesting and to some extent beautiful, yet a much more impressive and comprehensive picture of Fort Ancient is obtained if one will approach from the the east or southeast. There is a little valley about a mile east, or southeast of Fort Ancient. Until one's carriage ascends the opposite slope, there is nothing to indicate the great embankments that burst upon the vision and give one an impression never to be forgotten. Although it is more inconvenient, visitors should leave the train at Blanchester and drive to Fort Ancient, entering it by the east road. The view thus obtained is surprisingly beautiful and it excels in its impressive grandeur anything in the way of a picture of prehistoric ruins in America. If visitors to Fort Ancient come by way of the railroad in the valley, they should drive through to beyond the Fort, and then turn about and approach it in the manner the writer has described.

The elevation crowned by Fort Ancient is of interesting geological formation. The glacial action has been intense as is evinced by the numerous ravines, and one understands it better if he will take the pains to walk down the railroad track to below the South Fort.

These ravines do not cross the railroad track and empty into the river; the soil in the river bottom is very sandy, and the water brought down from the hills by the ravines is quickly absorbed; there is no wash, no erosion. The points of land or rounded hillocks between the ravines are mostly gravel. The presence of this gravel in the localities referred to is due to glaciers or icebergs. The points are quite round, and of so regular outline that they have frequently been mistaken for mounds. But they are natural, not artificial. The valley was probably a lake formed by a dam or gorge of ice at the lower end.

When this valley was a lake, the icebergs and cakes of ice, which carried more or less gravel, were floating around in it, and many of them driven by winds or drifted by currents, stranded on the hill, and there deposited their loads of gravel. The slope of the hill was once all gravel, and probably presented a regular appearance. It is rather peculiar that while such extensive deposits are found on this (the east) side, there should be none, or but very little, on the opposite or western side of the river. The numerous ravines have cut out a great deal of the gravel, and have given it the present irregular outline. We dug into a number of these rounded points, and found glacial gravel less than a foot from the surface. Back farther on the high ground, where the fort lies, the drift is not so heavy, and is clay. Immediately below this glacial clay lie the limestone and clays of the Cincinnati group, which comprise the greater part of the hill and extend downward for several hundred feet. This limestone, as all know, is exceedingly rich in organic remains, and the entire Miami valley is noted among geologists as a field for fossils.

Students of Fort Ancient who wish to understand the place thoroughly should accompany the survey entirely around the circuit. This is somewhat tedious but by no other method will one gain a comprehensive idea of the size and character of the enclosure.

The instrument was set just south of the Lebanon and Chillicothe pike on the east side of the northern section of the fort where the road passes out. This is "station 0," from which we make all calculations and measurements. Plate V, is a summer view of the long and heavy embankment from 0 to station 7. This view was taken at 1,000 feet distance, and the camera was pointed east. The frontispiece, Plate I, shows two sections of the embankment— a nearer view. This is from station 2 to station 4, and is at a point where the embankment is the highest. On the outside of the walls at station 0, and extending past station 7 to the edge of the woods, is a deep and wide moat, which follows the base of the embankment and serves as a protection. At station 7, this moat becomes a ravine washed out by natural forces.

From the two mounds just east of the fort walls, there is a shallow ditch leading toward the south-west, where it deepens into a natural hollow. Our attention was first called to this ditch by Mr. George Ridge, one of the owners of Fort Ancient who has lived alongside the earthwork for fifty years, but Caleb Atwater refers to it in his book. There were a few excavations made at various points in this ditch, and some things of interest found.

One hundred feet south of mound an excavation large enough to permit two men working at one time, revealed the original surface of the ground 2 1-2 feet deep, and pottery fragments, animal bones and burnt stone in the bottom.

Three hundred feet further south another place was opened, and here the original surface of the moat was found to be over four feet below the present sod, or grass line. It is apparent that when dug, the ditch was five and a half feet deep (or more). From the surface to the bottom, the soil was unusually black and "mucky." Possibly this condition was due to decay of vegetable matter — of water standing long in one place — or to some unknown agency.

Numerous pottery fragments, mostly large, and quantities of animal bones were removed. For many years the plow had crossed this ditch and although the soil was very mucky, it was not as heavy as that found nearer the fort wall in moats, where it seemed almost like peat. To the writer's mind this is an indication of Fort Ancient's age. Such muck cannot form in a few generations, one is led to believe.

It is probable that wigwams occupied the land along the ditch—which was outside the embankments of the New or North Fort, it should be remembered—and the refuse found in it was thrown in. A complete exploration of the ditch may result in discoveries of note.

Its purpose is, first, for protection; second, to obtain material for the construction of the fortification. Nearly all the earth for the formation of the embankments was taken from the interior of the enclosure. The ground inclosed is somewhat lower than that outside; the clay layer is very thin, as if it had nearly all been dug up. In some places the loam or surface soil rests upon the limestone, there being but a few inches of clay remaining.

Just opposite each opening in the wall, or, as we prefer to call such places, gateways, the moat has the appearance of having been filled up. Upon close inspection, however, we find that the moat was not made continuous; it stopped short at the entrance. The earth was dug out on each side of the gateway, thus leaving a narrow road on a level with the surrounding plain. This roadway may have been used as a means of egress and ingress, and would be more convenient than had the moat been carried through without a break. At station 3 in the map, one sees a platform or fan-shaped mound thrown directly in the gateway. It extends out toward the east, and forms quite a wide roadway across the moat. From its general appearance and its connection with the gateway, we conclude that it indicates the principal entrance to the inclosure.

The embankment at station 1 is 22 feet in height, measured from the level outside. The moat on the exterior is two feet deep, and was once five feet deeper than at present, which would give the wall an altitude of 29 feet. As the embankment was once much steeper than now, the barrier would be impassable.

At least so it seems, after one has restored it in his imagination to such form and condition as it must have presented when completed by the builders. Not so difficult is such reconstruction if one is willing to devote weeks to a careful study of the depressions and elevations. By contrasting one place with another—that is, other earthworks in Ohio—and by comparing different parts of Fort Ancient, the observer is able to learn much.

In excavating in the moats, traces of wood were encountered. In some places, the fragments were readily distinguished, but they were too badly decayed to admit of identification as to species. These fragments may have once been logs that were placed in the openings and used as a bastion. The traces, however, are too slight to determine anything with certainty as to their purpose.

The last station is on the north of the road, just opposite station 0, and is station 407, as has been previously stated.

The wall rises slightly from station 0 to station 1, so that the latter is the highest point upon the entire fortification. Standing here, one can see that the earth which composes these great embankments was taken, for the most part, from the interior of the inclosure. The ground inclosed is somewhat lower than that outside, and there is little clay; the top soil or loam seems to rest directly upon the limestone. We say "for the most part," because a great deal of the earth was taken from the exterior moats.

The space between the walls at this station is on the same general level as the outside field, but a platform or graded way has been thrown up in the gateway, which leads down in the interior. This has been so cultivated that its original shape can not now be determined. The next two stations that are gateways, we notice, as we go south along the wall, have no platform thrown up in them, but are cut down to the general level of the surrounding plain. The length of these three walls is 85, 110, and 159 feet respectively, and they are about the longest stretches of embankment that we have. There are three large poplar trees upon these straight embankments. On the authority of a Cincinnati botanist in the publication of the survey and observations of 1889, the writer stated them to be 100 to 150 years of age. This statement may not be correct, although personally, the writer believes it. Old residents of Fort Ancient state that these trees were practically of this size when they first saw them. Growing 20 feet above the surrounding level they appear grand and imposing, standing like sentinels upon the walls, and one is impressed with their beauty when viewing the fort from a distance, as they are seen towering far above the other forest trees.

At station 10, the wall passes into a heavy woods, which it follows, sometimes being entirely surrounded by forest trees, again bordering on a cleared field, for the whole extent.

Plate VII (p. 43) is a view looking north along the top of the wall from station 12 towards station 1. The embankment makes a sharp turn here, and we could get a very good photograph of its height. This photograph, when compared with Plates I and IV, will show the massive structure of Fort Ancient. In speaking of these gateways, the reader must not infer that every opening is a gateway. We use the term gateway because we have not a better one. It is probable that wood-work was built around the outside portion of the openings, and they were used for additional defense, somewhat like bastions in a modern fort. Between stations 11 and 22, we notice an interesting thing: a depression follows the wall to station 16, where the wall was built directly across it; the ditch, being changed by this means, follows uninterruptedly around to station 22, where it joins a ravine which breaks through the wall.

Since the wall was built, the ditch between stations 16 and 22 has washed out to a depth of 16 to 18 feet. Just beyond this point, and at station 19, a spur of land runs out into the hollow; which spur has been used as a bastion. Many of these spurs may be noticed at frequent intervals of the fort, and they are always natural, and have not been artificially shaped. In many places on the outside of the wall, the bank has washed considerably, but the wall itself, being of tough clay, which does not easily erode, is still very plain. On the opposite side of the ravine, at this station, 22, the wall does not extend down the slope, the end of the wall being at the top of the bank. Some ravines were probably very small when the fortification was built and the wall was carried over them, but the larger ones could not be protected. Many of these have since washed out, and the washes in some of them are quite old. Some indication as to the age of the fortification can be obtained by studying them.

Up to station 36 there is nothing of special interest, and the reader can look on the map for the bastions, spurs, etc., and see them for himself. At station 36 the wall was once built solidly across a deep ravine, but it has since washed out. The builders appear to have made no provision for drainage at such points. The streams flowing through these hollows would necessarily wear away the embankment, and in process of time destroy it, no matter how heavy and strong it might be made.

The moat at station 42 is still on the inside of the wall. At station 44 a narrow level space extends from the foot of the wall on the interior with a moat or ditch on each side. There is no depression in the wall at this point. Opposite stations 33 and 34, over in the woods to the south, and across a deep hollow, are three small mounds. These were explored, but little was found. They will be described later in Chapter V. From station 45 to 47 there is a deep hollow. The wall seems to have been built at one time clear across the hollow, without a break, but it now extends

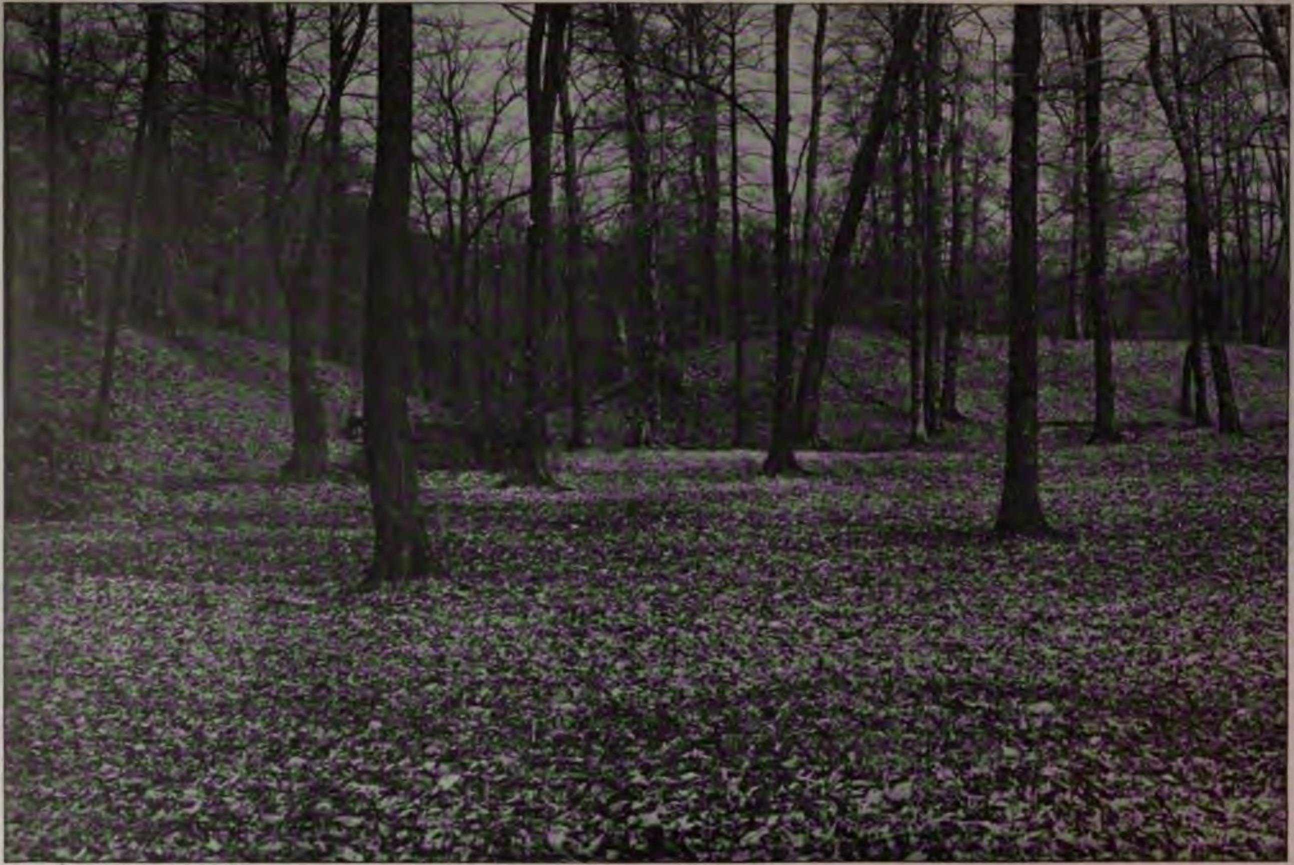

PLATE XI.

A Portion of Old Fort Walls, near the Great Gateway. Camera pointed Northeast.

only part way down the slope on each side. At the stations just named there is considerable stone showing in the wall. It was probably put in to keep the wall from washing.

The ravine is deep — about 100 feet — and the slope quite steep. But for a heavy growth of grass and brush, the erosion must have been considerable. But these deep depressions are so sheltered that ferns and kindred plants grow profusely and the hillsides remain intact.

At station 57 another of those bad washes occurs, where the wall has been built solidly across the head of a ravine, but it was cut through for drainage by a farmer, and "the result is as usual." The entire embankment has washed out within the last few years.

At Station 63 begins the narrow neck of land which is known as the Isthmus, on which the Crescent Gateway and the Great Gateway are located.

At stations 76 and 77 there was formerly a curve in the wall, but a ravine has obliterated a considerable portion of it, and where once stood a beautiful and graceful stretch of embankment, now remains an ugly and unsightly depression. At the stations just mentioned there is a glacial deposit, consisting of gravel. When built, the wall was probably near or at the head of this ravine, but the hollow has washed back since that time to its present position, nearly 40 feet further inland than the west extremity of the wall.

At station 80 the wall seems to have stopped at the edge of a large ravine near the head. Just opposite this point, at the foot of the wall on the opposite side, it makes a sharp turn toward the interior of the fort, which would leave a deep depression between the two walls. This depression seems afterward to have been partially filled, making a path-way or passage-way from one wall to the other. On either side of the connecting-way is a moat now nearly filled. The arrangement of these walls seems to have been very much like that at stations 76 and 77. At station 80, half the earth being of clay, the erosion was not so pronounced as in the gravel of station 76, hence this place is still intact.

At station 85 there is a large bastion, which overlooks the spur. This spur is very long and level, and 150 feet to the east of this station is a large stone grave, which contained the remains of skeletons. Many of the spurs on the east side of the Isthmus have on them stone graves, nearly all of which were opened by our party.

From station 88 the wall was built solid across a small ravine, but has since been broken down by erosion. From this station to the end of the New Fort, the embankment is built on the hill-side, and in several places its top is lower than the summit of the hill. The distance across the Isthmus to the wall upon the west side is slight, being not over 100 yards. The ravines on each side very nearly divide the hill into halves, and about 100 feet north of the Great Gateway they come so close together that the distance between them is barely 60 feet.

At station 89 and at station 306, on the opposite side, begin the circular or crescent-shaped embankments, which run out from the east and west walls. This spur we have named Crescent Gateway, on account of the beauty of the curves at this point, and in order to distinguish this gateway from the Great Gateway, or the one dividing the Old and New Forts.

At station 102 the Great Gateway begins. This will be fully described later on, when each interesting portion of structure is taken up and enlarged upon in detail.

At station 105 there is a moat on the inside with no platform or approach to it from the outside. It leads down from the two walls of the Old Fort to the head of a large ravine. If a gateway, it would be difficult of approach from the inside; if a bastion, it would require a great amount of work to make it defend any thing, as it is 100 feet back from the head of the ravine. In coming out, by turning to the left, at the foot of the first mound, one could easily reach the Isthmus outside, and it is possible the opening was left for this purpose.

Station 109 is similar to 105, and is an opening in the wall leading directly into a ravine with no approach from the inside. Like station 105, its purpose is conjectural.

At station 110 begins a terrace, outside of the wall, which gradually widens in extent, until it passes station 112. It is covered with stone heaps, the exploration of which will be described later. This terrace has been omitted from all previous maps of Fort Ancient, and the only reason we can assign for this omission, is that it is located in the wildest portion of Fort Ancient. The fort wall above is cleared on top, and there is a nice, level path extending around. One could look down into a mass of wild grape-vines, underbrush, logs, rocks, etc.; people did not care to investigate in such a place, it was much nicer and easier walking on the embankment above, so they left these most interesting parts of Fort Ancient for years undisturbed. Mr. J. Thomas Brown of Waynesville, Ohio, a geologist, has made a study of Miami Valley terraces and in the ***American Antiquarian*** (Vol. X, p. 167), he published a paper, — "Prehistoric Artificial Terraces in Ohio." In this he treats of Caesar's Creek terraces, six miles north of Fort Ancient. They are identical with terraces found on both sides of the river flanking the earthwork, and therefore the writer quotes a portion of Mr. Brown's remarks: —

"One of the most interesting groups is on Mr. Hisey's farm. The whole hillside is wrought out into broad platforms, the upper one being the broadest and shortest, the face of the hill behind, having been dug away so as to form an amphitheatre with an arc of about 180 yards. There is a similar example though not so large on the south side of the creek.

"As a general thing the terraces, when in groups, are from 200 to 300 yards in length. Some single ones are much longer.

"The aggregate length of those which have been discovered and traced along Caesar's Creek is more than 5,850 yards, or considerably exceeding three miles; besides which it is most likely there are some which have as yet escaped identification. In places they are obscure and a practiced eye is needed to detect them, nor is this to be wondered at, on these steep hillsides. There must have been some waste to the width of all of them, through the action of frost and water on the lower side, and a constant tendency in the mellow loam on the hillside above to slide down upon the terraces for the same reason, so that all of them must be narrower than when they were left by their builders; but in most cases they are remarkably distinct and well preserved.

* * * * * * * * *

"The idea that these terraces are merely landslides, is too preposterous for lengthy consideration. That there are landslides there, is true, though not so many as has been supposed, but they can readily be distinguished by the practiced eye from the work of man. In one instance the whole hillside has been broken down from top to bottom and the surface left in uneven billows for a distance of several hundred yards, due, it is said, to the earthquake of 1812. The terraces are uniform, horizontal, often repeated.

"A like sweeping objection can be made to the theory that they are alluvial terraces or in any way due to the action of water; their position is too variable along the hillsides; they are not composed of the right materials, nor is the geologic history of the valley such as to warrant it. And above all, there is too obvious a method in each terrace and in the groups of terraces. They are platforms built out from the bluff side, generally without much show of excavation along the upper side of the terrace. The earth seems to have been in a measure brought from somewhere else, from the loose surface soil, most likely, wherever it could be most easily obtained. Sometimes the signs of excavation back of the terraces are more readily seen. They are, unqualifiedly, artificial, and would have been so recognized and described long ago, but no one had ever seen them all until this late exploration, and the knowledge of them in detail was entirely wanting."

The Fort Ancient terraces are: above the enclosure, below the enclosure, opposite the enclosure and across the river on the western hills. Levels of these were taken by Mr. Cowen.

One on the western hills, across the river is 137.7 feet above low water stage in the Little Miami.

The second terrace, at Mr. Ridge's, north of the fort, is 136.6 above low water.

The terrace on Mr. Cowdin's place, just along the fort hill, is 135.2 above low water.

These are very remarkable figures, there being but little more than two feet of difference between the lowest and the highest. This is the more remarkable, when we consider that at one point, where the level is nearly the same, the terraces are nearly two miles distant from each other.

The question at once arises, could they possibly be due to natural causes? Does nature ever observe such regularity of platforms, whether made by geological deposits or land-slides?

No other answer can be made to these queries, save this: that the terraces are *artificial;* that they were built by *men.* We excavated in various parts of them, and our investigations go far to settle the question. We have found in them flint flakes, and a few pottery fragments, several inches below the surface; and, in three cases, scales of flint and pottery fragments, one foot in depth. These facts go far in establishing the human origin of the terraces. Obviously, they were occupied by men; used by them for some definite object; for exactly what, it is difficult to tell.

Atwater says they were used by the Indians in their wars with the whites; and, in marching against a tribe, they would traverse the terrace as far as it extended. It is noteworthy, also, that these terraces are both numerous and extensive. That which is on the west side, overlooking the river, runs for a distance of over a mile. It runs from Mill Grove, on the south, to opposite the railroad station at Fort Ancient, on the north.

At Waynesville, 10 miles up the river, there are a number of clearly defined terraces of undoubted artificial origin along the hill-sides bordering on Caesar's creek.

Attention has been called to these by Mr. Brown, of Waynesville, and others. They are of the same appear-

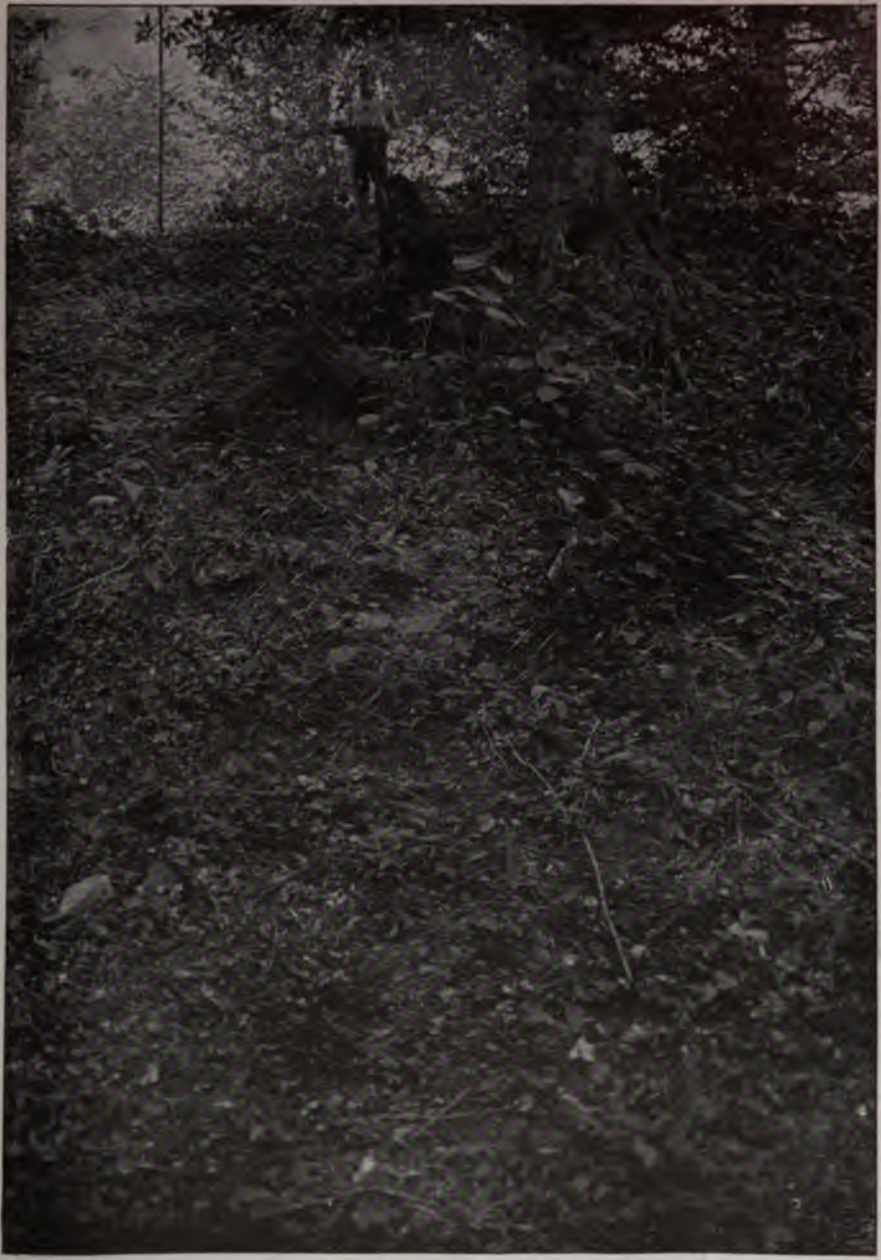

PLATE XII.
East Wall of Great Gateway, at the Highest Point.
Camera pointed West. The View is from the Base upward.

ance, and character, and purpose as those connected with Fort Ancient.

There is an interior ditch from station 110 to station 123. At station 113, the terrace begins again outside the wall, and extends, sometimes, only a few feet in width, but does not disappear until we reach station 122. There are graves upon this terrace, between stations 113 and 116. Opposite station 115, there is the largest single heap of stones to be found on Fort Ancient, and it may contain as much as 100 tons.

Station 116 is a gateway with an interior approach which leads down to the terrace. The outside of the wall at this point is very high and very steep. Between stations 119 and 120, the wall of the fort has been built solid across the head of a ravine, but has washed out. From station 110 to station 123, the wall is built lower than the top of the hill, and this is what forms the interior ditch. The earth for the wall is excavated between stations 110 and 123. From this point on to station 187, is a succession of washes, spurs, and bastions, which are quite similar in character, and which do not need further explanation, as they can readily be seen on the map.

Station 187 is on a very high portion of the wall, and is the south-west corner of Fort Ancient. It is generally called a mound, and is built directly across a spur. From station 190, which is at the foot of this high embankment, often called a mound, the wall is built down the slope to the bottom of a ravine, and up the slope on the opposite side; traversing thus the entire ravine. The wall has suffered to some extent from rains and floods, but is still distinctly traceable. The wall at this point makes an abrupt turn to the north-east, which trend it keeps quite accurately for some distance. At station 194, there is a gateway which has a level approach from the interior of the fort, and there is a moat or ditch on either side of the roadway. Many stones are in the opening, and it opens out upon a spur overlooking the river far below. A large stone grave covers the spur.

At station 201, there is a bastion overlooking a deep ravine, and at the corner of the fort there was once a considerable pond, but some one has cut through station 201 to drain this pond, therefore, the wall has washed badly.

At station 209, there is about the largest ravine in the fort. The wall is built down the slope of this deep ravine, solid across the bottom, and up on the opposite side. There is a gap in it through which the water passes during rainy seasons. It would require a strong wall, with some means of outlet, to prevent its washing down in heavy rains. Considering its position, it is one of the best preserved walls in the entire fort. On the spur opposite station 224 (on the river, or west side), is another stone grave. The fort wall has extended for some distance along the edge of a hill overlooking the Miami, and will continue to do so until we pass station 250. There are two large terraces between the top and bottom of the hill, the upper one of which has many graves upon it. Terraces were favorite burying places

Just beyond this deep gulley, is a place where the wall is built across the head of a ravine. There is such a depression above, that if this wall was built to the height of ten feet, it would make a pond of nearly or quite half an acre. This looks so much like a reservoir, that I am tempted to consider it such.

Station 231 may be either a gateway or a bastion, and overlooks a regular slope on the outside, but there is no spur leading direct to the river. At station 248, there is a narrow spur which runs out nearly on a level with the interior fort. The wall here, as will be seen in the map of the fort, runs out to a point, and overlooks the valley below. One mile up the valley — more or less — the river-bank village site is in distinct view. Were the timber cleared, much of the New or North Fort could be seen. If lookout stations were in use among the builders, then this was one. An arrow can easily be shot into the Miami river below. Experimenting with an English yew bow which pulled sixty pounds, the writer was able to throw a steel-pointed arrow clear across the stream and fully fifty feet beyond the western shore. The view is beautiful and an illustration, taken from Mr. Tichenor's "Guide to Fort Ancient," is presented in Plate XXI, p. 97.

Stations 245 to 250 comprise the point of the spur, and in the interior there is quite a deep depression clear around; the earth has been taken for the embankment from the inside. There is a roadway leading down to the mouth of a large ravine, near a spring, and near the river. At station 250, there is a depression in the wall, where it has been built across a ravine. A portion of the area within it has filled up level, but the embankment without is very high and steep. On the spur on which 248 stands, the wall is built below the summit of the hill as far as station 252, at which point it returns to the crest. At station 267, there is a moat, on the interior. This moat is unusually large and deep, and holds water the entire year. It was once undoubtedly much deeper: the mud in it is quite soft, and somewhat of the nature of a quagmire, as a number of cattle have mired and perished in it before they could be extricated.

At station 267, there is a gateway, and at stations 268 and 269, there is a graded way leading down the hill to the plain below. In the deep ravine beneath this point, are several excellent springs of water, and it is possible that a pathway led hence down to the springs, and that the hill has been artificially worked to secure an easy approach. Station 286 is the end of the embankment or mound on the west side of the Great Gateway. Station 287 is the middle of the entrance to the Old Fort, between the two so-called "mounds."

There is a platform mound inside this entrance, which leads down to the level within. Underneath the embankments, and in this platform, there is a large amount of rock chiefly limestone slabs such as lie about the surface of the Great Gateway.

The portion of this platform extending toward the south was found to contain many human bones.

The platform is about four feet above the general inside level. From its appearance, we think it was built before the Great Gateway was completed. It was not an addition; the whole part of the fortification was built at the same time—the southern part.

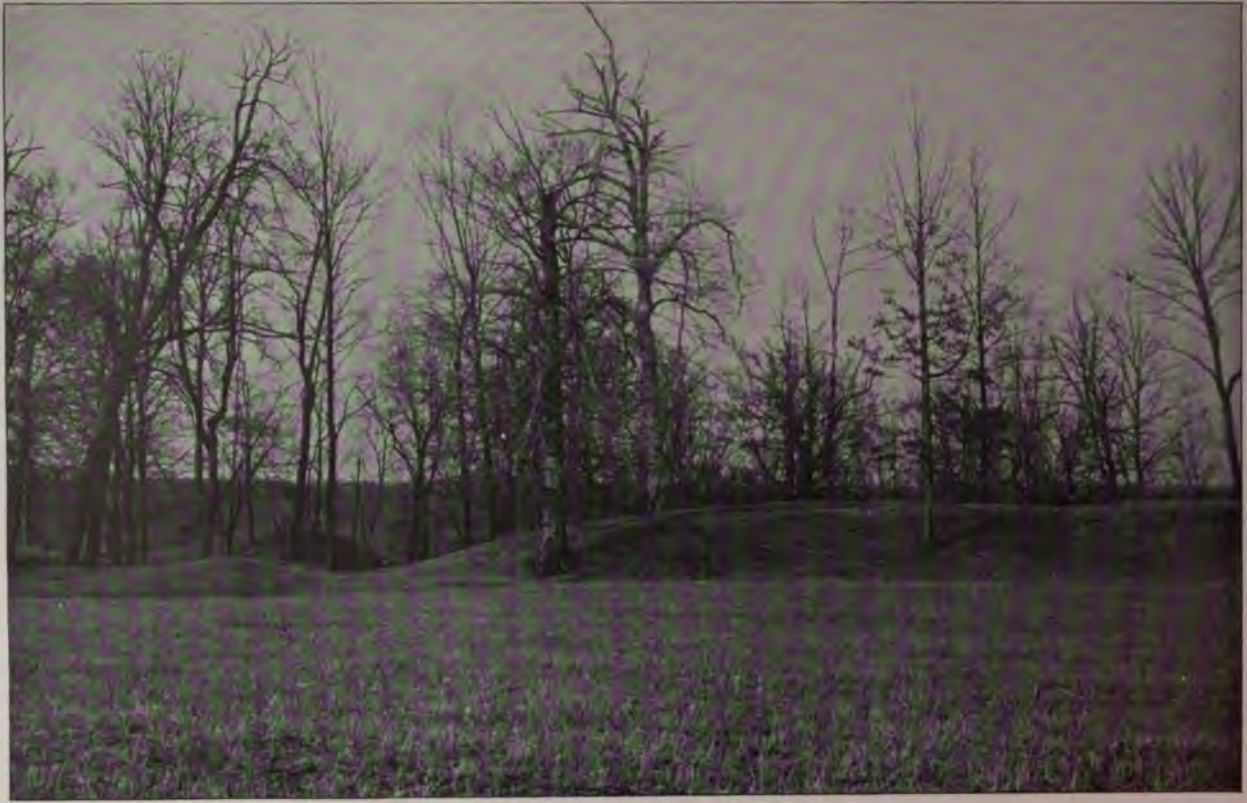

PLATE XIII.
A Corner of the Old Fort, west side. Camera pointed Northeast.

From station 289 to 290 is a deep ravine, which has been washed out of the gravel deposit by both underground and surface drainage. This ravine extends well within the walls at present, but it is probable that, when the fort was built, the wall ran just to the head of it, as in similar cases at other points in the fort. The wall has been built up around such places, and it is quite likely, also, that the wall extended much further than station 290. The present end, as it stands, reaches to the edge of the ravine, and caves in more or less every year. Before the wall was built, most of the drainage at this point went down in the ravine, which heads at station 294. The wall being built across the head of this ravine, would cause the water to run along the inside foot of the wall, until it reached the present washout, which it would assist greatly in excavating.

At station 295, the wall is composed almost entirely of stone, which shows on the outer slope for fully 20 feet below the top. There is much stone in a gateway at station 301.

At station 307, is a depression, where the wall crosses the ravine, which, however, is now filled up nearly level with the adjacent surface. In this immediate vicinity (station 306), begins the crescent wall, just within the fort wall.

At station 309, there is a gateway, on the exterior of which is found a large quantity of rock. This gateway leads along a gentle slope of drift gravel, and at the end of the slope is a round knoll, at a distance of about 600 feet from the wall. The knoll is about 25 feet higher than the ridge on which it stands, and from its top there is a regular and gentle descent to the river bottom. The descent is quite uniform, with no juttings or breaks in any of its parts. Viewed from the river side, the slopes that fall away from the knoll are so symmetrical as might almost induce the belief that they are artificial. All the spurs and lower hills outside the fort wall, between the ravine which empties opposite station 248 and the ravine which forms the northern boundary, including the entire hill up which the pike winds its way, are of glacial origin.

Between stations 322 and 329, the wall is built slightly below the top of the hill. At station 324, is a bastion or gateway leading out on a long spur toward the spring. At station 328, there is a bastion, overlooking a deep ravine.

From station 320, the wall is built down the slope of a deep ravine almost to the bottom. On the opposite side, the wall extends up the slope from the bottom to the top. It is probable that the wall was built solidly across this ravine, and has been washed out. On the west side, the wall seems to have deflected the water and made it strike against the wall on the east side, as the slope of the ravine on each side is as steep as earth will lie. Erosion at the bottom of the wall would cause the part above to drop or slide down to the lowest part, and be washed away.

There is a small mound 100 feet due north from station 334. Station 337 is a bastion or gateway, with level approach on the interior, with a moat on each side opening out on slope leading down to the side of the large ravine.

At station 339, the wall is built across the head of the ravine, and is washed out. At station 342, there is a shallow depression in the top of the wall, where the embankment makes a sharp angle. In the interior, is a level approach, with ravine on one side and a deep moat on the other. This gateway leads out on an easy slope down a narrow ridge of drift gravel, descending gradually to the river bottom. Station 345 is a bastion. Station 349 is a gateway, with interior level approach, a moat on each side leading down along the edge of a deep ravine, giving an easy descent to the bottom below. From station 352 to 353, across the big ravine back of Mr. Howard's house, there is a break in the wall. It is not probable that the wall was ever built across this ravine. Some other mode of protection or defense was necessary. The sides of the ravine are so steep, and the force of the water so strong, that the earth could not have been made to stand.

Between stations 357 and 358 the wall was solid, with a sharp turn, almost a right angle, across the head of the ravine. Here there was a moat or small pond inside the wall, and the owner of the land, or some one desiring to

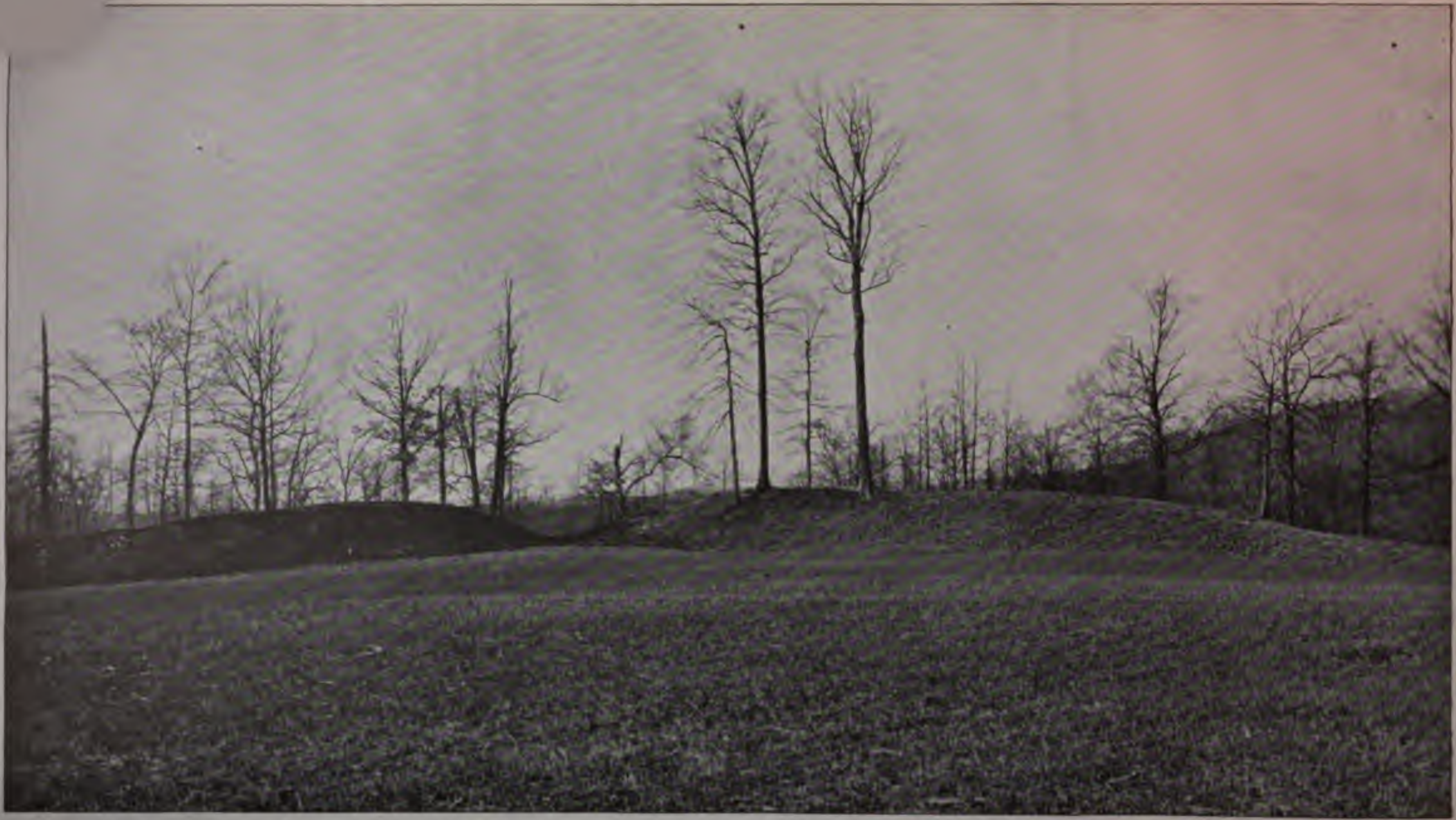

PLATE XIV.
Old Fort, near the Souhtwest corner.

drain it, cut a small trench through the wall, which was built on a gravel deposit. The water soon began to undermine and cut out a wide ditch, and in spite of efforts to prevent it, the wall on each side caves in more or less every rain. The gap is now 57 feet wide, and will continue to increase unless some effective measures are soon taken to stop it.

At station 360 is a gateway leading down hill on a narrow spur toward the railroad station. Between stations 363 and 364 the pike passes. This was apparently one of the main gateways of the fort. On both sides of the pike within the wall, the earth has been excavated to a large extent to be used in the walls. The pike, however, follows the extent of a kind of platform, having the original level for a width of 70 feet, from which part no earth was removed. It has the appearance, viewed from the entrance, of an artificial elevation, but is simply the original surface left to make an easy passage. The first wall on the north side of the pike, although very heavy, forms a crescent, almost a semi-circle. A large amount of earth has been excavated just within to be used in the construction of the embankment. Formerly this contained water to a depth of several feet during the entire year, but it is now almost entirely filled up with decayed vegetation. Station 367 is a bastion overlooking a narrow spur that runs out between the road and a deep ravine on the north. Its gateway could not be reached from the interior directly on account of the pond above mentioned. It would be necessary to approach it from one side or the other on the wall. There is a depression where the wall was built solidly across a deep ravine, but has washed out. At station 374 there is a gateway leading down to a deep ravine on the north. Beginning at station 375, there is a terrace on the outside of the wall which extends as far as station 387. From station 370 to station 388, the wall is built below the top of the hill, on the slope. Between stations 378 and 379 the wall must have been heavy across the ravine, but it is now washed out. A natural ravine has formed by water running along the inside of the wall, which in process of time, has cut its way through the embankment.

Station 382 is a gateway which leads out upon the terrace. At station 386 the wall was once solid, but was pierced for the passing through of a road, so it is reported; but, from the indications, we think there was a gateway there, and very little, if any, excavating was done to allow a wagon road to pass through. There are large flat stones in the bottom of the wall at this point, and they crop out at the edges and can be plainly seen. At station 390 there is a bastion opening out on a ravine. On the interior there is a level, but the gateway is slightly higher.

At station 394 the wall was once built across a small hollow, but for some reason unknown to us was left quite low, so that it has the appearance of having been washed out, leaving a depression about twenty-five feet in width.

This has an easy approach from the interior, and on the outside leads down a slope to the bottom of the ravine, at a point where a branch comes in from a good spring in the field north of the fortification. There is a regular passageway through station 397 to the mouth of this branch. The spring has unusually cold, clear water, and it seems as if an artificial channel led from it to the ravine at the place mentioned.

Station 402, at the north-east corner of the fortification, was probably a bastion, as it opens down into a ravine; but it may have been a gateway leading out to the field northeast. Station 405 is a gateway opening out toward the large mound on the east side of the pike. This gateway has a great deal of stone in it.

Between stations 407 and 0 the pike passes.

The summary of the survey may be stated in the following figures:

Total length of the walls of Fort Ancient	18,712.2 feet.*
Length of the parallel walls . .	2,760 "
Length of the crescent in New Fort.	269 "

Distance in a straight line from stations 187 to 389 (the most distant points north and south) . .	4,993 feet
Total length of terraces within one mile of station 0	$5\frac{3}{4}$ miles.
Grand total of artificial work in length	$10\frac{17}{32}$ miles.

The parallel walls are 2,760 feet *each*; readers must not fall into the error of considering the above the length of both taken as one continuous embankment,

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*This length of the walls is obtained by measuring and surveying the center of the embankment on top. There is no allowance made for spurs, bastions or elevations. The Crescent Gateway is not included. Were these added we would probably have a total length of 21,400 feet.

CHAPTER III.

THE POSITION OF THE FORTIFICATION. POINTS CONCERNING THE GATEWAY AND THE MOATS

It will be observed, on the map, that in the center of Fort Ancient extends a long, narrow isthmus, flanked on each side by two deep and precipitous ravines. The width of this isthmus ranges from 100 yards at its widest point to a contraction compassed within 100 feet. Natives were compelled to traverse the isthmus in passing from one fort to the other. Taking one's point of view from the western walls, it begins at station 309 on the north, and extends to the Great Gateway, or station 288 on the south. In order to understand this isthmus and the central part of the work, which is by far the most interesting portion of the entire fortification, we will call the attention of the reader to Plates IX, X, XI, and XII. In Plate IX, at page 46, it will be seen that the road which extends through the entire length of the fortification passes between two large high mounds. They stand about 300 yards south of the point where the camera was placed for the taking of this view. These two mounds are about 20 feet in altitude, and at the base are ten feet apart, leaving just space enough for a wagon to pass between them. At their bases and between them is a raised platform four feet in height. This is more extensive on the side next to the Old Fort than on that lying toward the New, and when examined it was found to contain many human bones, in small fragments and much decayed. When within 198 feet on the east and 142 feet on the west of the Great Gateway, the embankment coming from the north on the edge of the isthmus on each side abruptly terminates. For a distance of 198 feet on one side and 142 feet on the other there is no embankment, the ravines having such a steep angle on each side that further protection was unnecessary.

Plate X, at page 52, will show the surveying corps as they stood on the mound and in the gateway. This plate

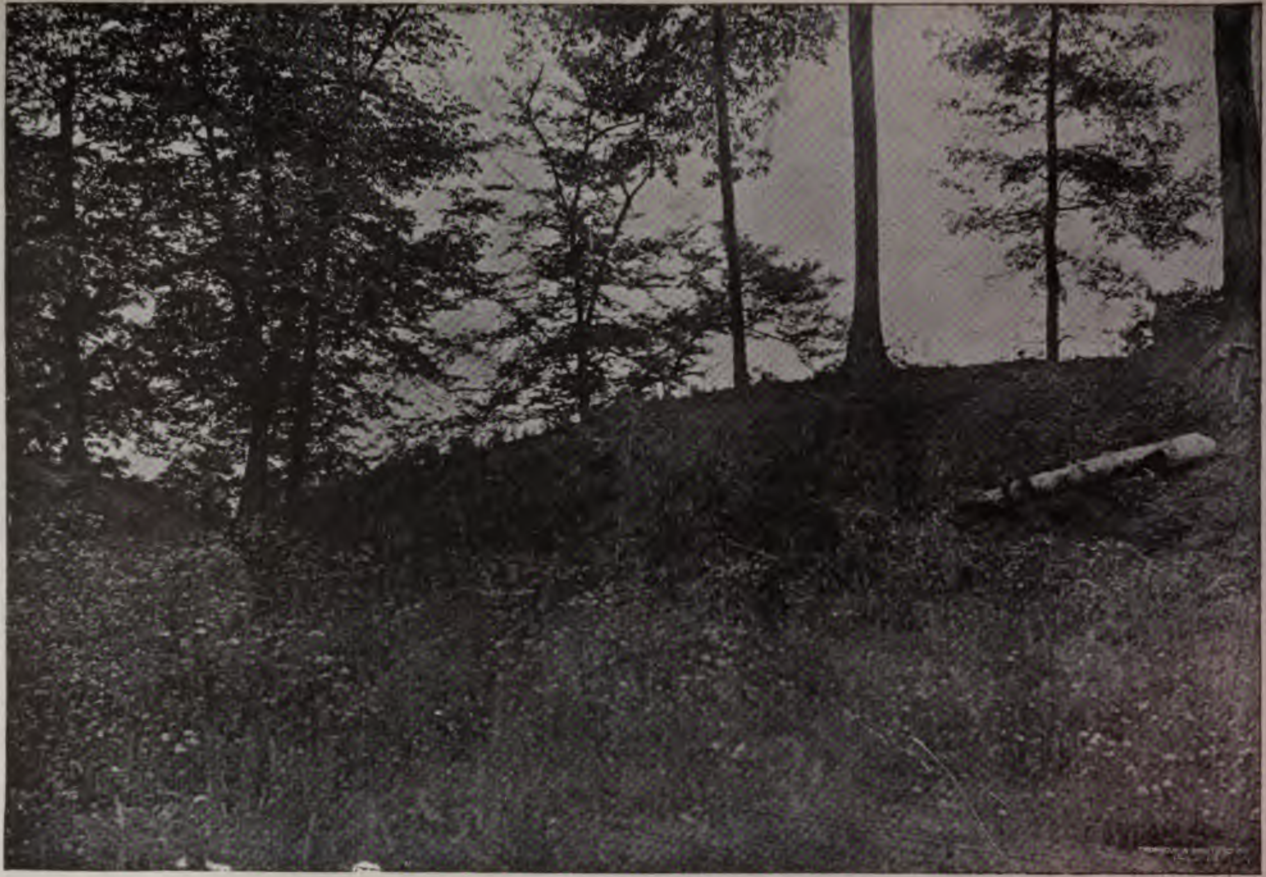

PLATE XV.
End of a Low Embankment, East Side of Middle Fort. Picture taken in 1889. (Station 86.)

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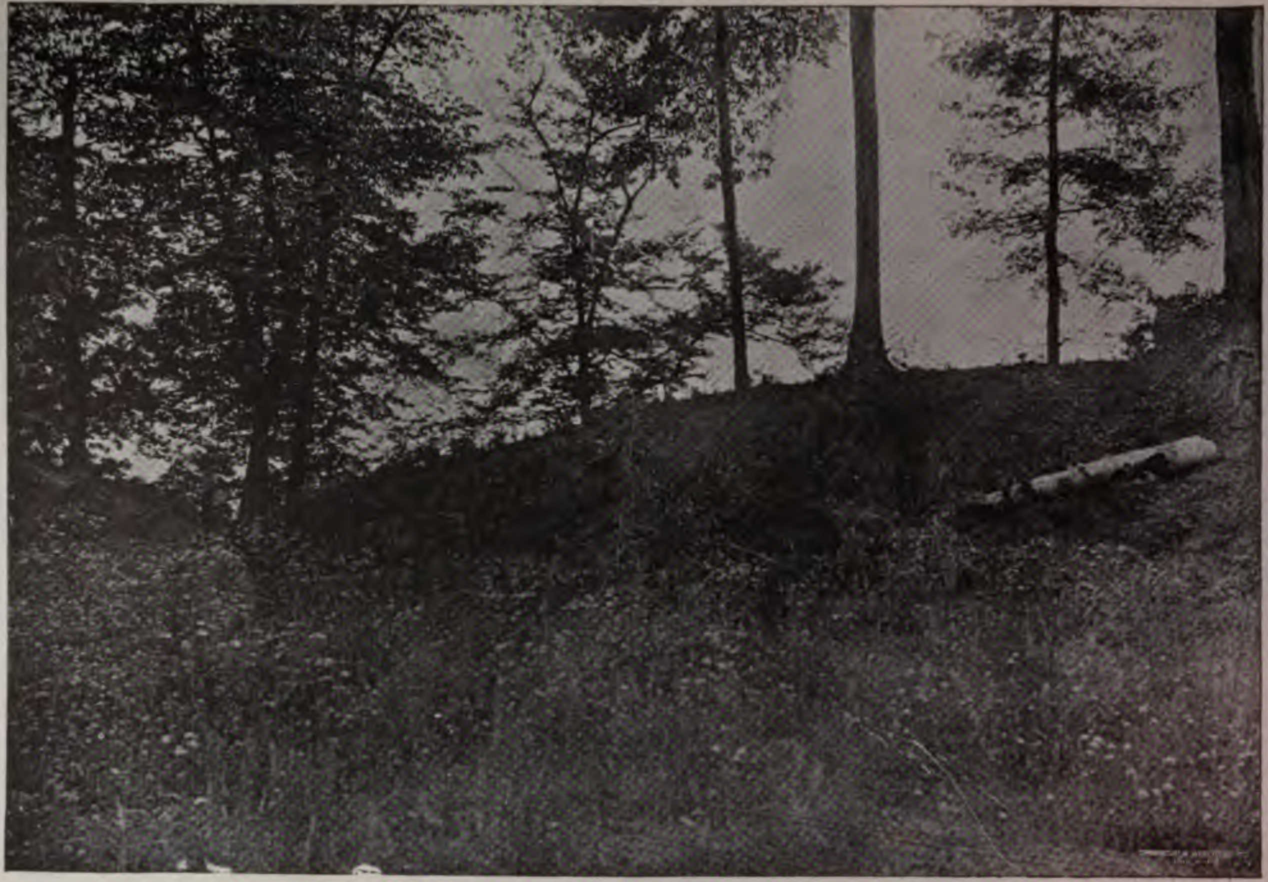

PLATE XV.
End of a Low Embankment, East Side of Middle Fort. Picture taken in 1889. (Station 86.)

also furnishes a close view of the Great Gateway, and by the figure standing on the summit of the mound to the left, or east, one will obtain an idea as to its height when compared with that of a man of six feet.

It may not be improper to observe that in some of the pictures with which this book is embellished, trees and foliage are very conspicuous, often hiding the walls. It was impossible to secure photographs otherwise; and this constituted the main difficulty which we encountered. Nearly the entire area of Fort Ancient lay in a forest so dense that no little clearing had to be done before photographing, surveying, or excavating, could be done with satisfaction. Mr. Williams, who took views of the structure in the winter of 1905, for the writer, labored under no such disadvantage. Not only was the season propitious, but the fort is more open than formerly, much of the underbrush having been cut away.

All about the Great Gateway are masses of stone which were employed both as coverings for graves and as a protection to the embankment. Recently many of these have been hauled away by farmers. They are most frequent on the east side in a depression between stations 101 and 103. At this point the embankment is the steepest in the entire earthwork. At the base and protruding from the sides are many large water-worn limestones. These must, at one time, have been piled up in the form of a rude wall to strengthen the base of the embankment. The average size of these stones is 18 x 20 inches, weighing probably about 40 pounds each. Human bones are numerous in the soil under them.

Plate XI (p. 57) exhibits the east mound-shaped wall of the Great Gateway.

The road passes between them, and is four feet higher than the surrounding level on account of the platform mound which lies in the opening.

From the Great Gateway the two walls which constitute the Old Fort sharply diverge. One runs directly east, the other south-west. The wall running east soon swings around to the south; the other wall runs in a very irregular manner, being more tortuous than any other portion of the entire structure. About twenty-five stations beyond the Great Gateway, it assumes a southerly direction for quite a distance.

Immediately to the left of the Great Gateway there is a deep depression between the walls, which is filled with rock. These rocks are not the coverings of graves. They are stones that have been used to form a sort of wall at the foot of the embankments. By thrusting an iron rod into the bank at almost any point, one can feel stones still standing as they were originally placed. The earth from above has washed down and covered them up so that they now appear as if they had been originally covered with earth by the builders. Such is not the case. The stones were on the outside of the wall; the earth has since run down from above and covered them. Many of the stones have fallen down and formed a heap about the base of the high steep mounds at this spot.

Plate XII, page 63, shows how steep and high the embankment is just above the spot where lies the stone wall described. The figure at the top is that of a six foot man. Compare his height with that of the embankment.

Of both Old and New Forts, the interior is cleared, but there is left a fringe of timber extending all around the Old Fort and part way through the New, thus affording a source of protection and preserving the embankment as nothing else could. We find beech, walnut, oak, ash, elm, dogwood, poplar, and hickory. The beech is more numerous than other trees, and its roots spread out over the surface, forming a perfect net-work in places over the wall, and together with the moss, which is so abundant in many localities, affording an efficient barrier against erosion.

The places where the embankment has recently washed are those upon which cattle have stood and cut the earth with their hoofs, and thus started a small gully, or where some one has cut a drain through to allow water which has collected above to escape. The embankments of the Old Fort are markedly more irregular and crooked than those of the New. Their construction must have been more difficult.

At page 84 (Plate XVII) there is shown the outside slope of the fort wall, near station 280. The earth at this point has been dumped on the edge of the hill and allowed to fall down upon the outside, which has made the outside slope of the ravine very steep, perhaps 35 or 36 degrees. The height on the inside of the wall at this point is only nine feet. We trace earth artificially deposited at the base on the exterior 50 feet from the summit. There is considerable timber on the slope, as will be seen in the illustration, and the growth of grass and weeds is very heavy. We observe a moat here, within the enclosure, and from its size conclude that much earth was removed for the embankment.

The moat is of such extent in depth that water stands in it in places. Alongside the embankment, west of the Great Gateway, we dug in the moat to determine its original depth. Although at present it is but two feet deep, our examination led us to believe that when the aborigines completed it, the depth was five feet greater than at present—a total of 7 feet. The earth to a depth of two feet was exceedingly dark and heavy. Four feet from the surface were pottery fragments, chips and flakes of charcoal. The bones had probably decayed. From the bottom of the moat to the top of the wall is 16 feet. But as soil from the wall had washed into the moat, the total distance was, we are convinced, at least 19 feet.

Plate XX presents a bit of the Isthmus. A little spur juts out a few yards toward the west. From this point one commands a splendid view of the valley far beneath. It is possible for one to discern the hills flanking the river and Oregonia, three miles up stream, or north. The embankment is not steep and varies from four to seven or eight feet in height. In building the walls high, the earth was thrown over the edge of the bluff. One is able to differentiate the artificial slope from the natural. To the left of the picture the Isthmus contracts and the walls come nearer each other. At Station 296 (not shown in Plate XX), the embankment runs north and south and is made heavy at the head of another spur. At Station 296 there is an open space in front of the embankment, filled with stones, the design and use of which is by no means easy to explain unless they formed the walls at the base of the embankment.

CHAPTER IV

REMARKS UPON THE ILLUSTRATIONS. POINTS OF INTEREST. GATEWAYS AND DITCHES.

Standing on station 0, which is to the extreme right in Plate III, one has an uninterrupted view across 2000 feet of New Fort. To the left are the two mounds without the enclosure (see Plate XXIX). The fields are cleared on either hand, and far to the west, a quarter of a mile away, is the other side of the fort wall flanking the river. Note the difference between these embankments in summer and winter. The frontispiece is from the exterior of New Fort, the camera placed 250 yards distant and looking west. In Plate II the camera is brought nearer. In Plate IV, long, straight stretches described in Chapter II are clearly indicated. 1000 feet of embankment is shown, and in Plate V there is a summer view of the same walls as are observed in Plate IV. But in Plate V the view is from the inside of the fortification. Station 0 would be slightly to the left of the margin and is not shown.

In Plate VI we are west of the center of the New Fort and look at embankments flanking the Little Miami valley. Plate VIII gives a glimpse of the valley beyond the west wall of the isthmus. The lowest embankments are shown in Plate XXII. The road made use of by those who drive from the turnpike in the New Fort to the village site in the Old Fort is in the foreground. As the embankment is but four feet in height and does not appear to have ever been either steep or high, one queries why it should have been so weak at this particular place. Several theories suggest themselves. One, that palisades were planted to strengthen the wall. Another, that the wall was not completed at this point. Certain it is that the amount of earth now in evidence could not have constituted, originally, a wall of more than 6 or 7 feet in height. Although the writer is unable to prove conclusively his belief, he is of the opinion that the embankment was not completed.

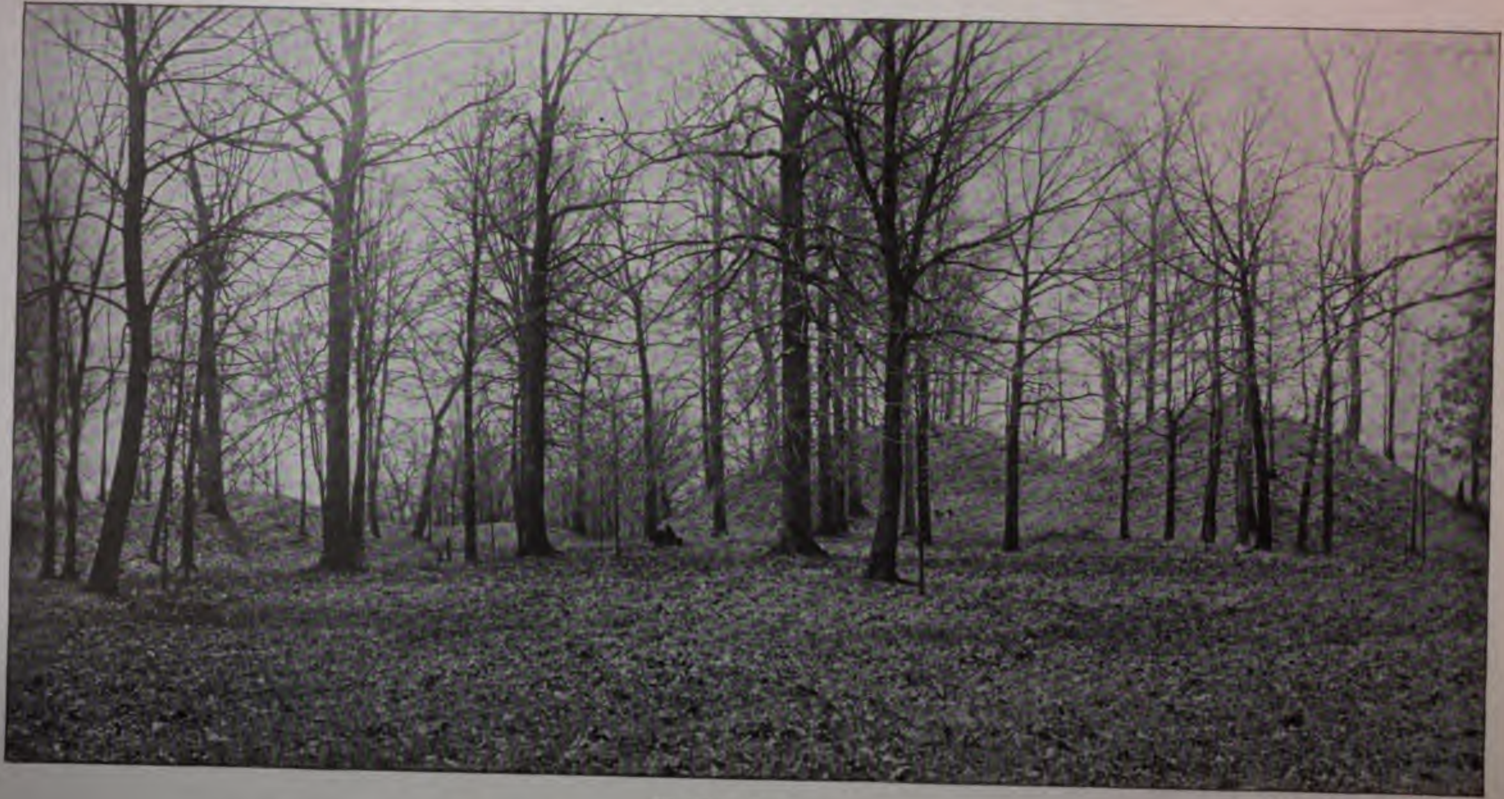

PLATE XVI.
Giant Embankments of Extreme Southern Part of Old Fort. Camera 150 yards distant, looking South.

Plate XXIII illustrates how that a small washout, through neglect, may become a menace. This serious break in the wall has occurred since Atwater's time. The State has since built a heavy retaining wall and further damage cannot occur. The washout was 57 feet in width and nearly 45 feet deep, or more than 20 feet deeper than the original height of the wall. However, the damage is not without its recompense, for the exposed sections show clearly the composition of Fort Ancient's embankments. There is variation in color and material, indicating that the natives scooped up amounts of earth varying from a peck to half a bushel, some working in loam, others transporting clay, and again those who carried stone. In the center the stones assume the shape of a rough layer. On the other side the stones weighed as much as 10 pounds each. There is a travertine coating on the stones — a natural formation. It is quite likely that the wall — at least here at station 363 — was built at two periods, separated by an unknown length of time. Vegetable matter accumulated between these layers, and when the wall was completed, this material lay between the first and second sections. The line of division is half an inch thick, is dark, clearly marked, and precisely such as is found in mounds, denoting different periods of construction. While loam and yellow clay predominate, not a little blue clay appears. Such material the builders must have taken from ravines and the limestone beds.

There has been frequent reference to limestone slabs so numerous about the Great Gateway, in the end of embankments and on the outside of the walls. By thrusting an iron rod into the earth at almost any point in the wall, these stones can be felt. Over most of them is a coating caused by carbonated water, flowing over them and dissolving a portion of the stone. In places where the stones are heaped up they seem to have been held together by a cement. The coating is travertine and due entirely to natural causes. Some early writers on Fort Ancient have called it "Mound Builder cement" — which, of course, is absurd.

The amount of stone and its position indicates that the builders constructed a stone backbone entirely around the enclosure. This varied, but usually it lay near the center of the embankment. It is quite likely that on the exterior stones were laid up forming a wall sloping slightly backwards — as they naturally would lying against the curve of the embankment.

Within the New Fort is a semi-circular, or crescent-shaped, embankment, somewhat injured by the state road running through a portion of it. It will be seen in the map as cut into halves by the pike. The height of this crescent is about two feet; the length of it, 269 feet. There is no use assigned to it. The portion north of the pike was covered and protected in 1899 by a growth of small bushes and trees.

The fort wall, on Mr. Ridge's side, the extreme north, runs comparatively straight. The average height of the embankment on Mr. Ridge's land is 13 or 14 feet, and there are fewer gateways on his portion than on any other of equal extent. There is a ditch on the inside for the entire extent.

We dug into the ditch running out from the mound on Mr. Ridge's side, with the following results:

The part dug was near the large mound in his orchard. At a depth of three feet in the bottom, and resting on undisturbed earth, and covered by the accumulations of years, was the bottom of what had once been a very large clay jar. It seems, from the fragment found, to have been at least a foot in diameter. The upper portion being gone, we could not tell the height. Several other fragments were found in this ditch.

On the south side of the Lebanon and Chillicothe pike, just south of mound 69, there starts another ditch or moat. This we carefully excavated, and found a number of interesting things. It has filled to a depth of three feet. This makes the original depth about four feet. There were fragments of charcoal and some burnt stone in it; that was all. We dug another trench about 100 yards further south, in the same moat, and here took out fragments of pottery, as many as one could hold in two hands. As the excavation was enlarged, more and more pottery pieces were found, but they were well scattered. There were fragments of the bones of a very large animal, presumably those of a buffalo, in the moat, and some flakes of charcoal. There was no burnt earth. A piece of mica, about three inches across, and chips of flint, were also taken from this ditch.

Resting upon the undisturbed earth was a layer of gravel reaching about two feet in width, and six inches thick at thickest part, running out to a feather edge toward each side. We do not know how far it extended along the moat, or why it was placed there. It was put there by the hand of man, as numerous objects, such as referred to above, were found on and in it. The moat here has been filled in by rubbish to the depth of three feet; it is three feet deep now. Its original depth at this point was therefore six feet.

Between stations 417 and 418, there is a place which has either been only slightly excavated, or else filled up again after excavation, as it is only a foot lower than the bank on either side, and has but a few inches of black soil above the yellow clay which is found at a depth of three feet in the other parts of the moat.

We dug in the "causeway" which leads out from station 5, but found that it was original earth (natural), not filled in, and that the elevation was undoubtedly made use of as a foot-way in and out of the inclosure.

After the causeway was examined, pits were sunk in the depression or moat on either side. 20 inches of black, mucky soil intervened and then the natural clay. It appeared to us that here the moats were never very deep. It is possible that the clay may have washed in, but we consider that improbable.

Outside the embankment at station 3 is a large, long moat, briefly described on page 51. Further excavations were made in it at another time and nearer the woods its original depth must have been four or five feet greater than at present — a total of 6 or 7 feet in excess of what it is today.

A hollow into which the ditch extends, rapidly deepens. A terrace follows it for nearly a mile, ending abruptly opposite a peculiar knoll, which may be natural, although

PLATE XVII.

it appears as if artificially rounded. There are also a number of depressions; all of which should be investigated more thoroughly.

It is likely that natives made use of the ditch as a covered retreat when they wished to pass from the mounds, or the parallel walls, or the pavement to the Old Fort and be protected en route. Again, that ditch may carry some ceremonial significance.

The writer is of the opinion that the ditches were more extensive when Fort Ancient was completed and that they bore a peculiar significance to the whole earthwork, a relation which is at present imperfectly understood.

CHAPTER V.

EXCAVATIONS IN AND ABOUT THE EARTHWORKS. STONE GRAVES, STONE HEAPS, ETC., AND THEIR CONTENTS.

Reference has been made to the stone heaps and stone graves so numerous about the Great Gateway and on the terraces. In addition to such, there are seven small mounds on the outside, within a few hundred yards of the fortification, but our map is not large enough to show them, and, besides, they are unimportant. The stone graves and the cemetery were opened very carefully, and drawings and photographs taken of their contents. In the center of the Old Fort in 1889 stood the stump of a large and old walnut tree on a perceptible rise of ground. For a distance of about 110 feet, all around the stump, are many graves, at an average depth of two and a half feet. These graves are formed of limestones, which were brought from the ravines adjacent, or the river valley below, and are placed on each side of the skeletons, at the head and at the feet, and over them. The skeletons found in the cemetery are of an average size, being about five feet six inches in height, and were buried similarly. But one exception of consequence was observed—that of a skeleton surrounded by a circle of stones. The following objects accompanied this interment: Near the left femur was a large spear head of yellow flint; near the left shoulder were remains of pottery broken into small fragments; near the right femur, a large stone celt. The bones of this individual were quite well preserved, and we saved them almost entire. From the grave-yard we took out twenty skeletons in various stages of decomposition. Some of these were as deep below the surface as three feet, and one was four feet.

The stones are about 15 pounds weight on an average. Some are heavier, and others lighter. Between the stones and the body there is usually four inches of earth. It is almost impossible to save anything except the skull in fragments, the femura, tibiæ, and heavier bones. Some of the larger phalanges and the os calcis are often entire, but the ribs, vertebrae, pelvis, and smaller bones are usually entirely decayed, and frequently no trace of them remains.

In this field (Old Fort) was observed at the time of exploration, some house-sites that have since disappeared. Some were clearly defined, others indistinct. They vary in diameter from 22 to 30 feet and two of the best preserved of them have a depth in the center of three feet. In character they are not unlike a small circus ring. The area inclosed is different in color from that outside. Fire has tinged the earth to a reddish hue, and pottery fragments, ashes and animal bones are to be observed.

Mr. Hughes, an aged man who has lived near the fort all his life, and was able to furnish us with much information as to the change in character of the surface since his boyhood days, states that these circles and depressions were plain fifty years ago. At the time of examination, the writer was led to believe that the large lodges in the South or Old Fort were similar to those built by the Mandan Indians on the Upper Missouri. He is still of the same opinion. If the structures were of that character, when the supports decayed, or the sun-baked clay was affected by frosts, the larger portion of the clay — where it was thickest — in falling would leave an embankment of circular appearance.

THE MOUNDS WITHIN FORT ANCIENT

Four of the mounds in the North Fort appear to have formed a rude square nearly in line with the cardinal points. This coincidence carries no significance, one is led to believe.

Four plates from the original edition of the book "Fort Ancient", describing these mounds and some stone heaps are herewith inserted.

On the east there is a small mound about 100 yards from station 1 and it is covered with burnt stone. About 200 yards south there is another small mound near the edge of the woods. There are two more equally distant to the north and west, thus making a square which, while not altogether exact, closely approaches it.

Near station 35, across a deep hollow over in a dense woods, are three mounds. They are 300 to 400 yards distant from the nearest approach of the wall. They vary in diameter from 20 to 30 feet, but they are all nearly the same altitude. The average height is three feet. These mounds were dug out very carefully and a few interesting things found. The following account of them is taken directly from the Field Book:

(The numbers used in reference to graves and mounds require a brief explanation. Last year, when doing field work, I began to number consecutively all mounds opened, in order that my notes might not be confused. These numbers were continued this year.)

The first and largest of the three mounds is number 50. It is near a saw-mill, and about one quarter of a mile due south from Mr. George Ridge's house.

The mound is four feet high, about 40 feet in diameter, and quite regular in outline. Work was begun Thursday morning, July 18th.

For a considerable distance in this structure nothing whatever was found, and, indeed, we were well into the center of the mound when we came upon a large mass of burnt clay, and considerable charcoal and ashes. About six inches above the base line was a fine layer of burnt bone; this was two or three inches thick, and extended over half the mound.

Below this, near the center, were two "pockets" covered by burnt stone, and extending two or three feet deep. There were pottery fragments in each of them. Near one of these "pockets" were three sheets of yellow mica, with edges neatly trimmed, and presenting a disk-shaped appearance; they were about six inches in diameter. There was a fragmentary skeleton in the mound, which had one arrow-head and some pottery fragments buried with it. It had on the right hand quite a mass of red ochre, which was probably used for war-paint. Near the southwest part of the mound a broken celt, and a black stone of rather peculiar form were removed. This latter was a very fine relic and can be restored. The length was about six inches, and the width about one and one-half inches. The pottery found in this mound is thin and well made, but not ornamented. There were no stones in the mound except a few above the bones, and these were not laid regularly.

Mound No. 51 is in the same woods as No. 50, and lies nearly south from No. 50, 200 yards, or about 600 yards from the north point of the fort wall near station 32 or 33. It is two and one-half feet high, and 40 feet across. This mound was dug entirely through, and traces of decayed skeletons were seen, but none of the bones were sufficiently well preserved to take them out entire. There were about 30 scales and chips of flint found with some of these bones.

No 52 is in the same woods, but is nearer the fort wall; it is on the edge of a hollow, probably about 200 yards across from the fort, opposite station 32. It is about 17 feet across and two feet high, and had a circle of stones, somewhat burned, lying immediately under the surface, extending completely around it. This circle was about 15 feet in diameter, and 20 inches wide, and about three layers deep; the stones were not laid with any precision, but rather heaped in. There was nothing whatever within this stone circle. In the same woods, where these mounds are, and on the ravines bordering on this side of the fort, there are numerous stone graves, in which skeletons have been found, and many relics have been picked up in the woods. The first time it is plowed, the find will probably be very remarkable.

The terrace on the east side of the Great Gateway has on its surface many stone graves. We opened one or two of these and found some very interesting remains. We here give a few notes from the Field Book as taken on the spot, and upon the same day the finds were made.

The stones in this pile covered an extent of 20 feet by 80, the stone running from 15 to 25 inches in height, and

the quantity in the pile is not far from 460 wagon loads. The graves are near the Great Gateway, and are on the east side next to the hollow near station 104, and are on the outside of the wall. There they are on a terrace of 25 feet width; this terrace is about 19 feet from the top of the wall above. We commenced on the west side of the terrace, and dug out a space about 20 feet wide, which was carried right through the stone grave. We then passed over several places where others had dug, and took out 15 feet of grave in one part, and 10 feet in another at the other extremity of the terrace.

There were decayed bones scattered all through this stone pile, and pottery fragments in large numbers. These were under the first layer of stone, and very much decayed. They were not over 10 inches deep, most of them, but the larger and better preserved bones were about two feet deep. From the number of bones found, there must have been 18 or 20 individuals interred at this place. Some of the pottery found was decorated, but most of it was plain. In one mass of bones was a very fine celt seven inches long, by four inches wide. In another place was a limestone of about 20 pounds weight, that had three cup-shaped depressions on one side, and three deep grooves on the other, as if it had been used for sharpening a tool of some description; the grooves look as if copper had been sharpened. The cup-shaped depressions were probably due to the grinding of paint. No animal bones were found in this stone pile, but several very fine knifes made of long curved flint flakes were found. These skeletons had stones heaped over them, not laid regularly. The bones were broken in small fragments, about two bushels in quantity. The bones were found in pieces not longer than six inches, and most of them less than four inches.

There is a large stone grave at the southern extremity of the fortification, just outside of the fort wall. The grave lies on a high terrace far above the river, and only 36 feet from the fort wall. The grave holds about 40 wagon loads of stone, which are heaped up and not laid in any regular order. Under these stones we found fragmentary bones, broken celts, and many flint chips. The bones, like those found in nearly all of the stone heaps, are very much decayed, and very fragmentary.

The terraces on the west side of the old fort, which overlooks the river, have scattered graves on them, some of which, when opened, yielded very interesting bones and relics; many of them, however, have nothing under the stone save broken and decayed bones. The river flows at the foot of the hill on this west side for some distance, and there are many points on the embankment where the descent to the river is very steep; an angle of 30 degrees, and where one could stand and shoot an arrow without difficulty across the stream. These terraces do not have graves their entire length, but only in certain places.

The following account concerning these graves, and copied from the Field Book, may be of some interest to readers:—Four of them were opened, situated on the terrace next to the top, or the third one, going from the river up. Two of the graves opened were located together, and may, perhaps, with propriety be classed as one large tomb. The stone contained in this grave would be equal in quantity to about 100 wagon loads, and is about two feet thick, spreading over a space the width of the terrace—20 feet—and was about fifty feet long. We threw out all this stone, which occupied the time of three men for two days, and under it we found a total of nearly 20 fragmentary skeletons. The skulls were crushed, and the jaws in most instances were broken, but such jaws as were saved we judged to represent individuals of average size, and quite strong. The teeth were much worn, as if they had eaten little vegetables, and their sustenance had been mainly derived from the flesh of animals. The bones that we did save entire, of the legs and arms, would indicate a people of about the same height with ourselves, but rather stronger.

There were the bones of children found in this stone heap, and, judging from the teeth of one, we should say it was about seven years of age. There were some inter-

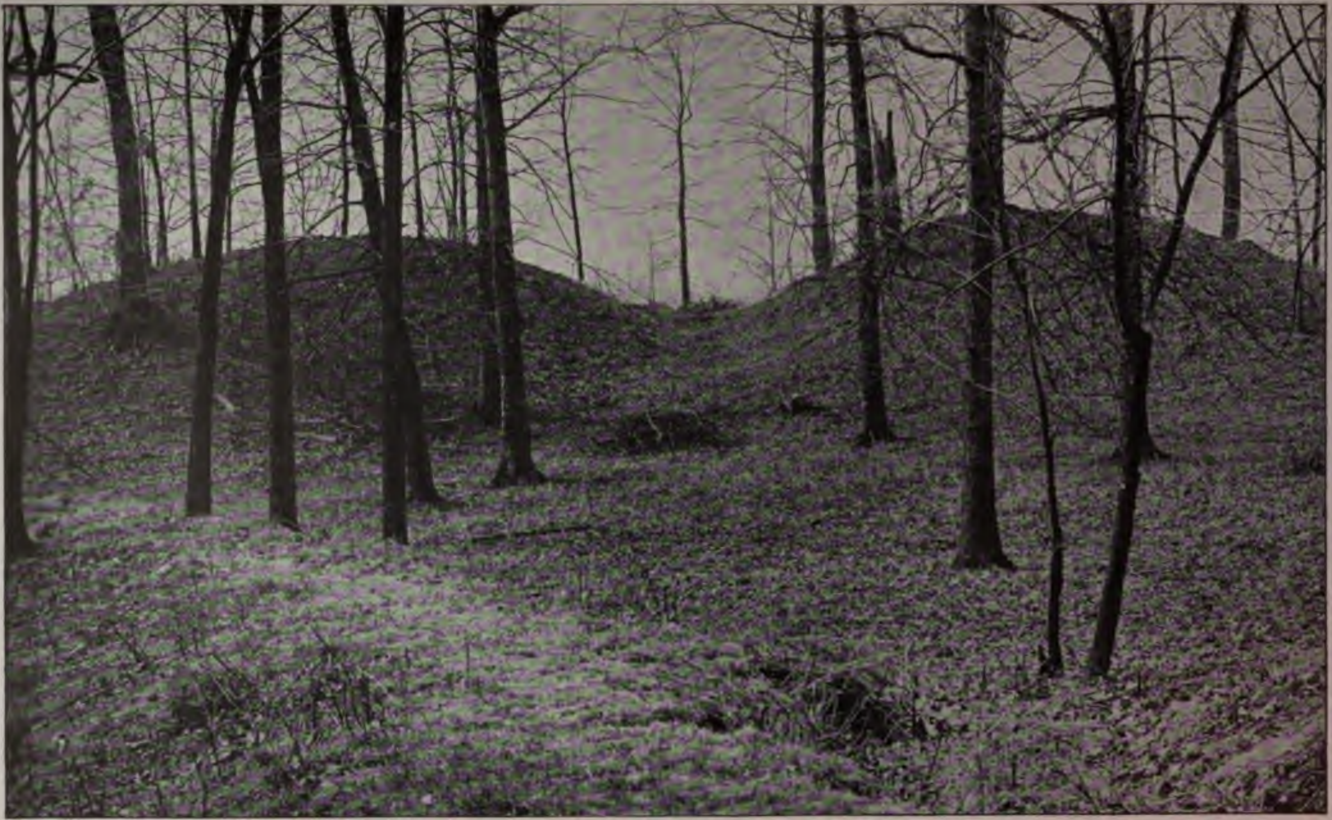

PLATE XIX.
Giant Embankment at Entrance. Southern Part of Old Fort. Near View, Camera pointing Southwest.

esting relics, such as a clay dish, nearly entire, and about five inches high; a beautiful ornament or personal pendant some four inches long, made of black slate, with a hole drilled through it; several arrow-heads; and a stone celt of unusual finish and beautiful shape. There were no bones of animals in this stone heap.

The other two graves were situated further north, one on the center terrace, and a third on the upper terrace. These contained numerous fragments of skeletons, but nothing of any interest in the way of relics, save a few small beads, one or two arrow-heads, one spear-head, and a few pottery sherds.

The earth wall along the west side is quite high in some places, higher than on the east side of the old fort. The ditch is quite deep here, and will average three feet below the level inside. The embankment in many places has a layer of stone underneath, presumably to keep it from slipping and sliding down the hill. Landslides in limestone regions being not uncommon, the natives took precautions against the danger here at Fort Ancient. However, some consider the stones of very slight protection or support in case the wall should become loosened in an excessively wet season, and start sliding into the deep ravines. The stones can be seen cropping out at the base of the wall in every gateway. Near station 248, on a point overlooking the valley, is a small grave containing about two wagon loads of stone. Yet underneath were three skeletons in fair state of preservation. With the skull of one individual was found a large flint spear-head, and with another several shell beads, a small but finely made arrow-head, and some ocean shells, which had been perforated and worn as ornaments. These bodies lay about 10 or 12 inches beneath the surface of the ground, with scarcely any covering. In most instances the bones in the graves in the woods and on the terraces are found within a foot of the surface.

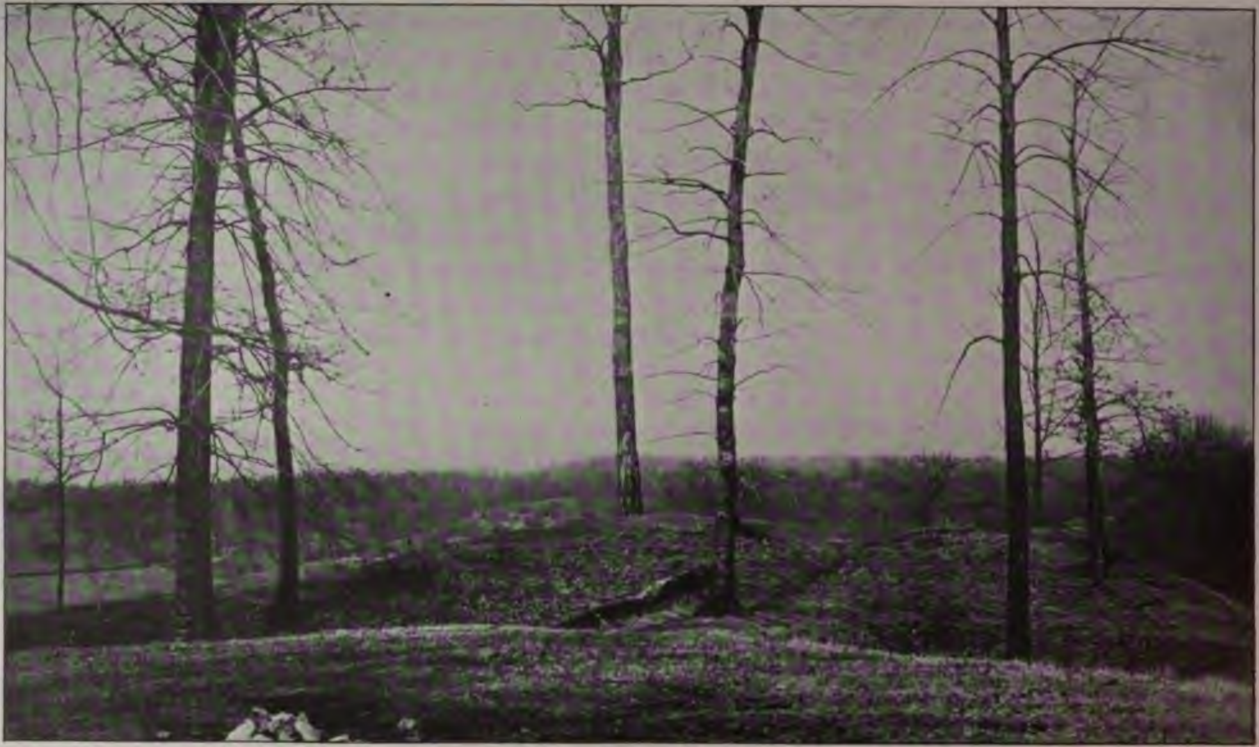

PLATE XX.
The Middle Fort (Isthmus), looking West.

CHAPTER VI.

VILLAGE SITE ALONG THE BANKS OF THE LITTLE MIAMI RIVER.

A preliminary examination was made of this in 1887 and 1888. In 1889 more extensive excavations were undertaken and a number of men employed for a considerable time. The village extends over a space of ground, possibly half a mile long and 400 yards in width. Most of the explorations were confined to a space 100 feet by 400 feet. It is stated that in the heavy woods on the flat across the river is another site, but the writer never attempted explorations on the west side of the river. As the river each spring washes and cuts into the banks, a thick hedge has been planted about twenty feet back from the edge. The bank in 1889 was perhaps 15 feet in altitude and nearly perpendicular. We were requested not to dig on the river side of this hedge, and therefore confined all our excavations to the east side of it. The first large excavation made was back from the hedge about 30 feet. At a depth of two feet we found numerous bones of animals, ashes, and pottery fragments. The soil at this point is a heavy black loam with some sand in it. It is very rich, and raises annually splendid crops without fertilization. The bones taken out from the depth of two feet were mostly in small pieces, and they were not nearly so numerous as those which we found at a depth of four feet. Four feet of earth has accumulated since the great village was there. It is at this deep level that we find pottery of a beautiful texture and finish, and implements of a better grade than those found at the two-foot level.

In these excavations the same order of arrangement is noticed every-where. First, there is a layer of loam about two feet thick; then there is a thin deposit of ashes, charcoal, etc. Then there are two feet to thirty inches of sand and loam, and the heavy deposit of refuse. At five feet we find, in places, a thick layer of bones, pottery, etc.; it is not,

PLATE XXI.
View of the Valley. From Tichenor's "Guide to Ft. Ancient."

however, continuous like the four-foot layer, and the village that left it was not so large as the two later ones. In some excavations the bones are few, and the mussel shells scarce. In others we seem to strike the site of a lodge and find many remains of occupation.

A few pieces of pottery of a dark red color, which were thick and clumsy, and a few bird bones were all that were found at two feet from the surface. From a depth of two feet until we had reached a depth of four feet we found nothing. At four feet we found the greatest deposit of objects described. This fact indicates that a very considerable length of time had elapsed since the first village was abandoned before the next one was occupied. At this level we found a large black mass of ashes, and soft earth, and burnt stone; such as would result from long continued cooking on one spot of ground. In this mass of ashes were the bones of 17 animals and birds, and many fish scales. We also took out eight bone needles or awls, such as the women of the tribe would use in the manufacture of garments of deer skin. Some of the pottery fragments found at this level were quite large and nicely decorated. The bones represent the following animals and birds: bear, deer, elk, musk-rat, ground-hog, raccoon, squirrel, rabbit and wolf, wild turkey, wild duck, hawk, owl, quail, cat-fish, turtle, and gar.

It is well known that ashes have a wonderful preserving quality and in the deeper pits minute fish scales and bones and the vertebral column of fish were removed in almost perfect condition. Needles, perforators and awls were quite common as were mussel shells used as scrapers and as hoes. Typical perforated mussel shell for the insertion of either a finger or stick is shown in Plate XXVI. Some of the awls may be seen in Plate XXV.

A number of children's graves were uncovered but no group of graves was discovered during the explorations in the summer of 1889. A child, probably two years of age, had been buried with unusual care. The stones were two feet by six inches, three inches thick and weighed about 75 pounds each—the largest that we found either in the valley or upon the hill. Near the head of the skeleton lay four shell discs, two small shell pendants and an arrow point of clear chalcedony. Since the grave was constructed, natives had camped on the spot above, for there was an ash pit 4 by 3 feet which contained much bone material and pottery sherds.

After the writer's appointment as assistant under Professor Putnam, work was undertaken again at Fort Ancient.[1] In "Primitive Man in Ohio" the results of the 1891 exploration were given to the public in Chapters VII and VIII of that work, and about half of the pages relating to Fort Ancient are republished herewith.

When we consider the magnitude of the walls of Fort Ancient, the immense amount of labor involved in their erection, and in the construction of the miles of terraces connected with them, we realize that all this required a long period of time or a large number of workers; perhaps, when we bear in mind the primitive methods of the builders, we are even justified in believing that it represents the prolonged and continuous industry of a numerous population. Taking this view of the case, it is a surprising feature to note that so few mounds occur in connection with this

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[1] When he was appointed to the position of field assistant for the World's Columbian Exposition Survey in 1891, Professor Putnam wrote him on March 18th of that year, giving instructions for the work to be carried out at Fort Ancient, viz.: "Taking into consideration the fact that the Exposition will have the benefit of your former work at this place, and the use of such plans and notes as you already have, I herewith agree that all material obtained during this expedition shall be at your service for study and description."

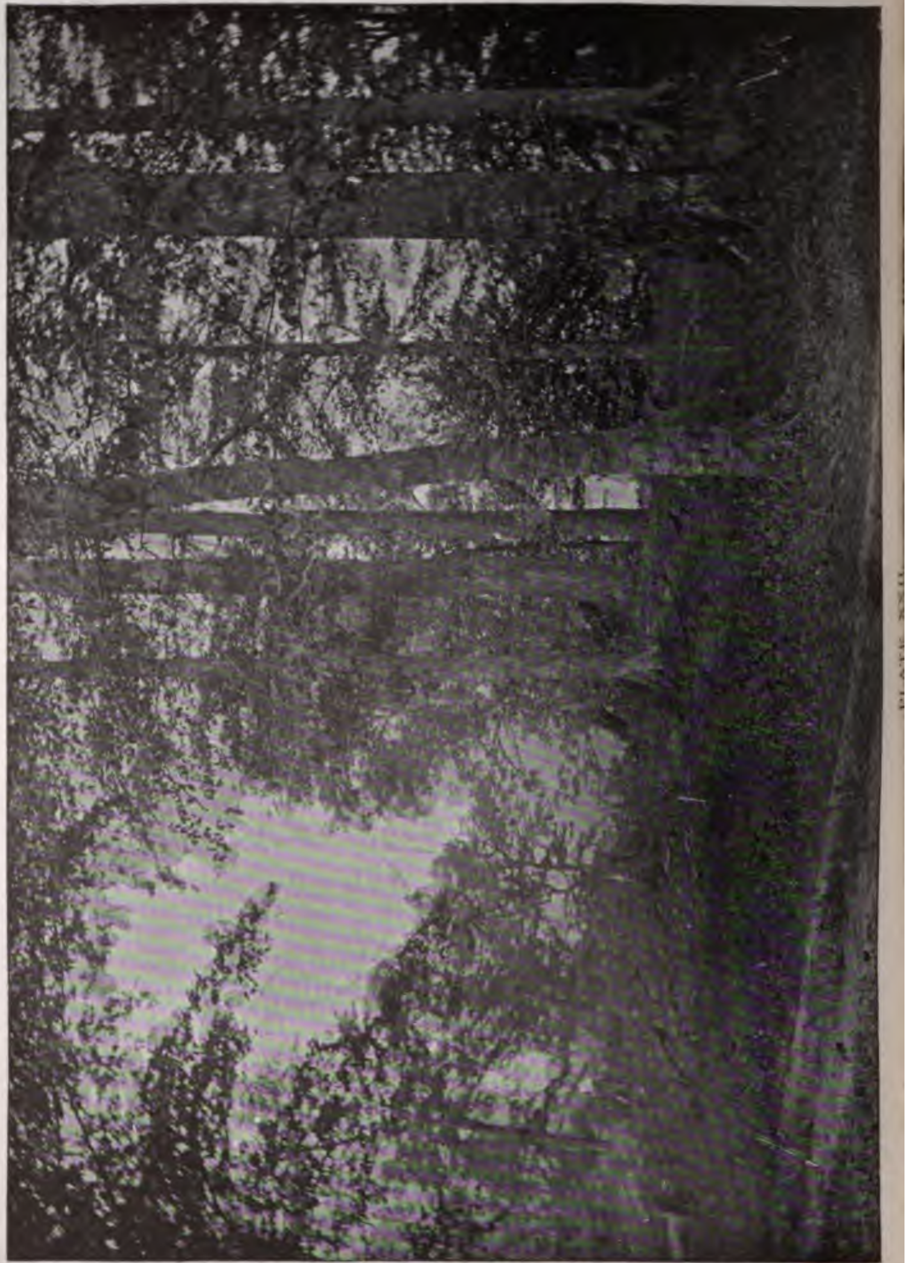

PLATE XXI

great earthwork, and that even such as do exist are of insignificant proportions. Omitting a few small elevations which have been plowed over until it is impossible to determine whether they are natural or artificial, and which have never disclosed anything that would throw light on the question, there are only ten mounds in sight from any portion of the enclosure; all these except one,[2] which is in the loop or curve formed by the junction of the parallels, at the farthest extremity of the fort, were thoroughly examined.

As the survey of 1889 was not able to thoroughly explore the village sites, under Professor Putnam's direction the author employed eight or ten men for some weeks in May and June, 1891, on the "Lower" and "Upper" sites. These are separated by a small ravine, merely, although the cemeteries were about 700 feet apart. The Lower one—south—was where we had dug in 1889.

One can observe both sites from a hundred places upon the towering fort walls above. It is so near the enclosure that but three or four minutes would be occupied in reaching safety should the villagers be compelled to flee at the approach of an enemy.

Besides the site mentioned, one mile and a half below the southern extremity of Fort Ancient is another large village covering some eight or ten acres rich in graves and debris. At the mouth of Caesar Creek, six miles distant to the north, are two extensive sites, one in the bottoms and the other upon the hills to the south.

The 1891 work confirmed what had been observed three years previously. For a depth of two feet there was little indication of occupation. This level was the highest, and therefore

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[2] This was examined in April, 1891. It contained nothing.

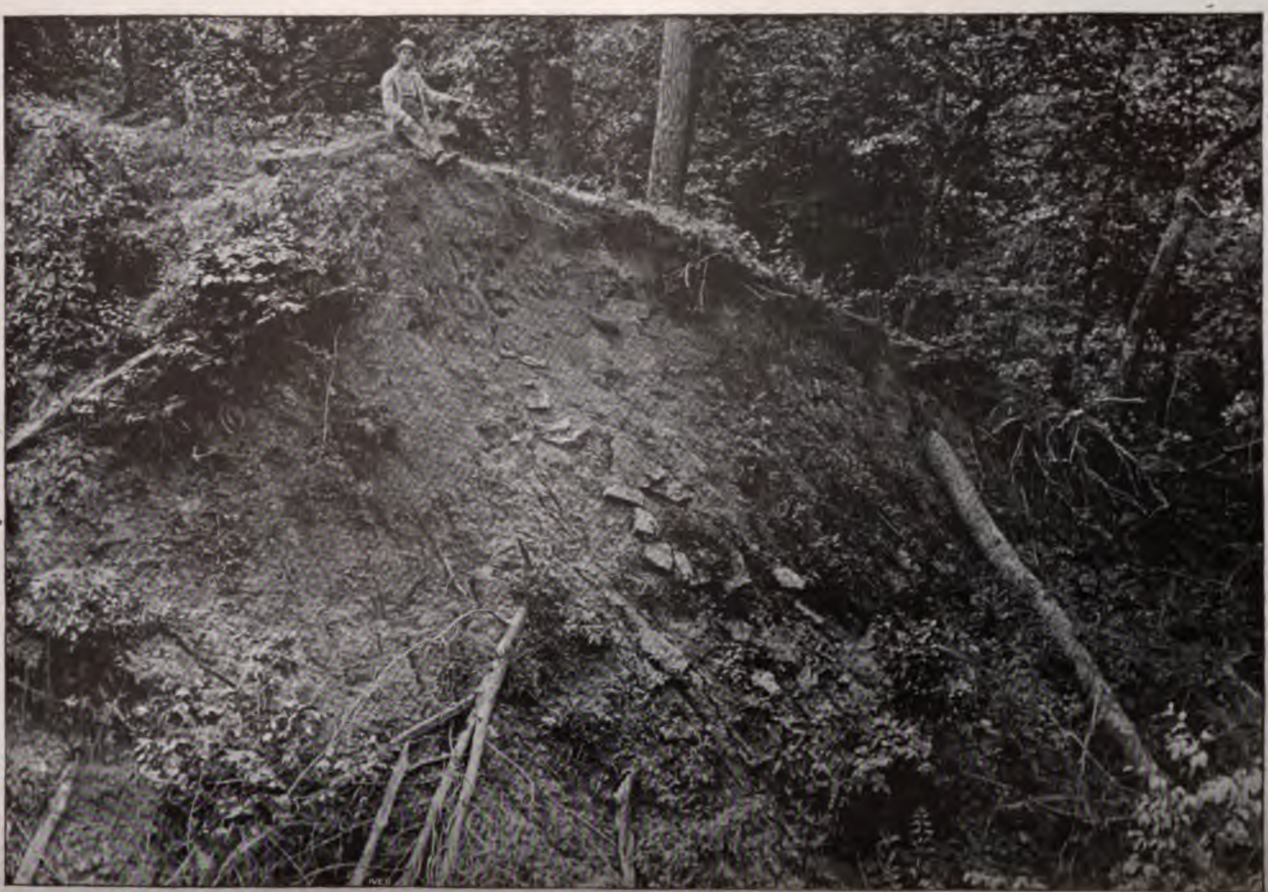

PLATE XXIII.

Washout in Wall, West Side of New Fort, near Sta. 363. Summer of 1889.

the latest, of three villages that had been situated upon the bottom. We found great quantities of burnt stone, ashes, charcoal, fragments of pottery, bones of animals and birds. Implements of stone lay scattered about and were, with few exceptions, broken or thrown aside in the waste so abundant in such places. This layer had a thickness of about six inches. After passing through it we found another stratum of soil not less than a foot thick, and in some places as much as eighteen inches. It did not contain any specimens of human handiwork. At a depth of one foot below the first layer the level of the second village site was discovered. It had been occupied for a longer period of time than the other.

A few inches of clean earth had formed between the second layer and the debris of the lowest or oldest site. Its highest point is fully five and a half feet below the present surface. The depth of this layer is less than six inches.

The greatest depth below the surface at which any relic was found in the three village sites was six and a half feet. The specimen was a small highly polished celt of green stone.

It must not be inferred that the "kitchen-middens" extended in a continuous, unbroken stratum at the various levels. In some of the pits we found all three strata, in others either one or two. A few places were entirely without layers and did not show any traces of fire from the surface to the bottom of the pit. Articles of aboriginal manufacture were also absent.

It is obvious then, that at three different periods in the past, separated from one another by considerable intervals, this bottom was a place of resort for the aboriginal hunters and fishermen of the Little Miami valley. But whether they came to spend the summer only, or whether the villages were permanent places of abode will never be known. On one hand is the great amount of refuse accumulated; but on the other is the fact that the ground is subject to an occasional overflow. At any rate, the intervening strata of earth containing no evidence of human residence, would show that, whichever view of the matter we take, occupation of the site was not continuous.

During the excavations at this point we unearthed three skeletons some rods back from the river. The first was that of an adult of small size, not more than five feet six inches long. This burial is noticeable for its peculiarity. The earth had been removed for a depth of two feet, and in the bottom of the space a hole had been dug large enough to contain the body. At each end of this hole a rectangular limestone slab had been placed to serve as head and foot stones. The body had then been deposited and four large flat limestones placed across with their ends resting on the earth at either side so they would not touch the body. The soil had then been thrown over the structure. The bones were well preserved, but no relics of any sort were found in the grave.

Within three feet of the end of the grave just referred to was one containing the remains of a child. It was similar in construction to the first, except that the headstone was omitted, and only two stones placed over it. A small quantity of unusually fine, soft black earth was with the bones — possibly the remains of garments or robes in which the child had been wrapped.

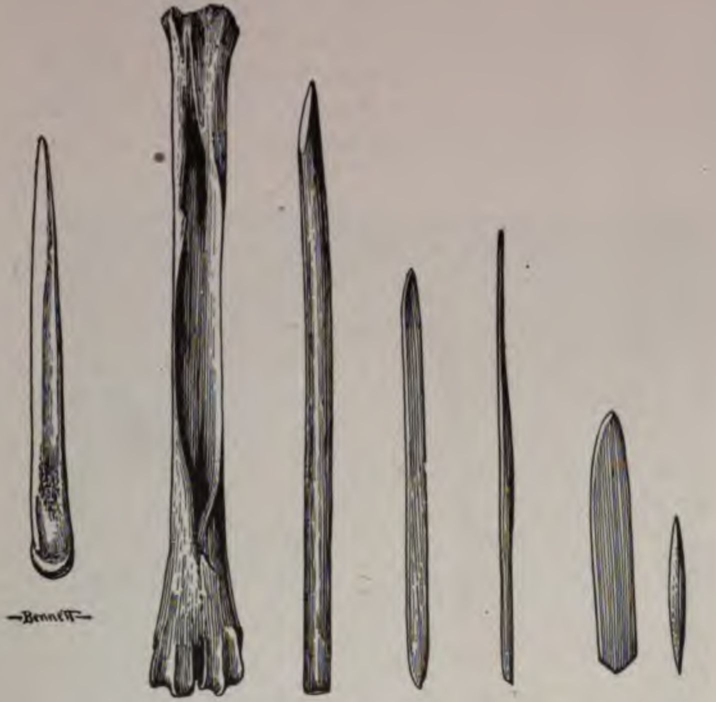

PLATE XXV.

Bone Awls and Scrapers, from Ash-pits, Fort Ancient.

CHAPTER VII.

GROUPS OF GRAVES.

In addition to the scattered graves found here and there under or in the village site, several small cemeteries of three to seventeen graves each, were uncovered. Most of them occurred in the Upper site and were more carefully constructed and different from those of the Old Fort.

It is interesting to compare the Fort Ancient graves with those of Kentucky and Tennessee where large cemeteries exist. The graves found at Hopkinsville, Kentucky, in 1903 (see Bulletin No. 3, Department Archaeology, Phillips Academy, p. 115), were more nearly, in point of construction, like those of Fort Ancient than the ones described by Gen. Thruston in his "Antiquities of Tennessee."

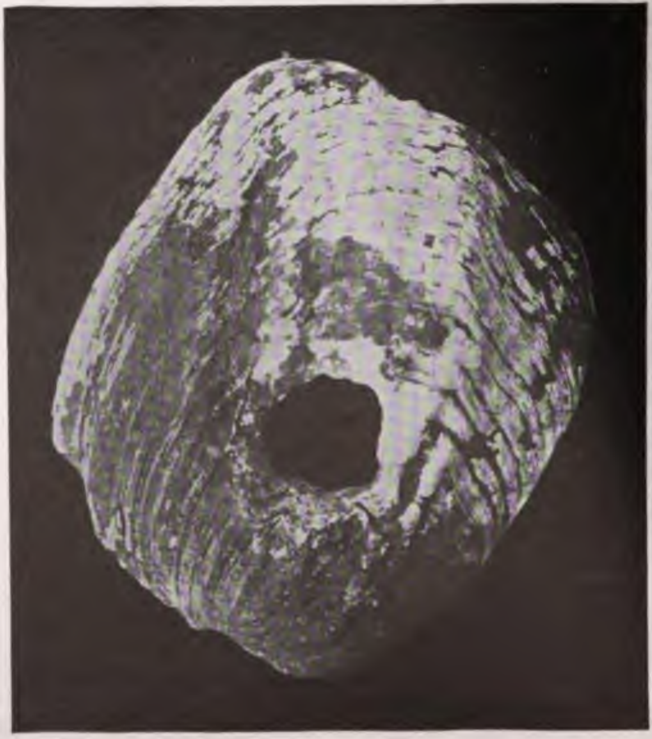

PLATE XXVI.
Typical mussel shell Hoe; Village Site; Full size.

General Thruston says:

"The rude cists, or box-shaped coffins, are made of thin slabs of stone. Sometimes the stones are broken or cut, or rubbed down so as to fit evenly and form a well shaped case, but more frequently they are rudely joined together. Occasionally they are found in mounds or layers, four or five tiers of graves deep. The graves are usually six or seven feet long, a foot and a half to two feet wide, and eighteen inches deep; but graves of greatly varying sizes and shapes are found intermingled with those of more regular form. The children's graves are proportionately smaller. Frequently the same cist contains two or three skeletons, and is not more than three or four feet long, the bones having been placed in a pile irregularly within it, indicating that they were probably interred long after death, and after some intermediate preparation or ceremonies similar to the burial customs of some of the historic tribes.

"Many of the graves in the vicinity of Nashville are lined with large, thick fragments of broken pottery, as neatly joined together as if moulded for the purpose. The author recently excavated several graves of this kind on Hon. W. F. Cooper's farm, near Nashville. The pottery burial cases were symmetrically formed, and seemed to be moulded in single pieces, until an attempt was made to raise them, when they fell apart, and were found to be composed of neatly joined fragments of large vessels; the heavy rims of the vessels, more than an inch and a half thick, having been used as rims or borders for the burial cases.

"Nearly all the stone graves are found to be filled with earth inside, by infiltration. The roots of trees have penetrated them. The very skulls are usually packed solid with earth, but now and then the iron pick will strike a hollow cist in its original state, and the fortunate explorer may be rewarded by finding a vessel or bowl of clay, perhaps two or three, within easy grasp, beside the still uncovered skeleton, and he will thus secure a better opportunity of observing at his leisure all the interesting details of the burial.

"Sometimes a little cluster of stone graves is found, with the usual accompaniments of pottery and rude ornaments, like many modern plantation burial-places, containing the remains of a single family, or group of families, that doubtless lived an agricultural life in its own farm dwellings. The remains sometimes found in these small isolated burial-grounds show that some of these villagers or country people must have been supplied with many of the domestic conveniences enjoyed by the inhabitants of the larger towns."

The burials in both upper and lower village sites were about equally divided as to adults and children, save in one or two instances. No objects were buried with the adults, but near the children were bead necklaces, small shell ornaments, and shell toys. Frequently a child would be placed alongside an adult woman, probably its mother. Occasionally the short grave of the child, but three or four feet in length, rested directly upon the long hollow vault in which lay the mother. But one or two male skeletons were found in the group of graves and those were young persons, not over eighteen or twenty years of age.

The lower burial site when uncovered presented a very singular appearance. We had excavated a great hole one hundred feet in length and forty feet in width to a depth of four feet, or until we struck hard river sand. Above this floor stood the graves from one to eighteen inches high. See Illustration

XXX. The deeper graves were often in the undisturbed river sand, and more carefully constructed ones were probably hollow, but had partially filled with earth, because the stones across the top were broken by horses or other weighty animals passing over them.[1]

The illustration shows some of the stones sloping toward the centre of the grave, thus permitting the water and earth to penetrate to the cavity beneath.

Upon a given day the 16 graves, comprising the lower group, were opened in the presence of a large number of people from Columbus, Cincinnati, and surrounding country. In those graves which were covered by perfect stones the skeletons remained well preserved. Out of thirty-seven graves in the three groups we secured twenty-five crania entire. All of these crania, together with village site material, were shipped to Chicago to be exhibited at the World's Columbian Exposition.

AGE OF THE VILLAGE SITE

The conclusions set forth after the two explorations mentioned, vary in detail, but agree in the main. The writer wishes to place on record the observations of that time, with a few unimportant changes. It must be remembered that there is no evidence that the Shawanoes camped for any length of time near Fort Ancient. Their large village, Old Chillicothe, was three miles north of Xenia or 25 miles from Fort Ancient. No glass beads or iron tomahawks or copper kettles have been found in the burials about Oregonia or Fort Ancient. The three villages seem to have been in existence before the advent of French or English traders. Mr. Hughes, previously quoted, who came to Ohio at the age of fourteen in 1812, affirms that the site along the river was covered with a heavy growth of scyamore, elm, walnut and oak timber. This testimony is presented for what it is worth.

At Oregonia 100 or more stone graves were opened for Professor Putnam. Graves were upon the hill summit and also in a mound of some size. This mound was more nearly like those found in Tennessee and described by Gen. Thruston, (while speaking of a certain mound he refers to stone graves): "A hundred or more of these rude sarcophagi are occasionally found deposited in several tiers, or layers, in a single burial mound."

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[1] It must be borne in mind that the tops of the graves were sometimes within twenty inches of the surface.

This statement is borne out in the Ohio valley by our own investigations, as well as those of others. While not at liberty to speak in detail of the work done by the World's Fair at Oregonia, Ohio, a few general remarks will be permitted regarding a mound of unusual character. Cæsar's Creek, a tributary of the Little Miami River, is noted for the large number of mounds existing near its banks. No archæological work was ever carried on in Cæsar's Creek valley prior to 1891. Hence, the field was unusually rich. Upon the heights overlooking the creek and the Miami River to the south is a large village site, covering sixty or seventy acres of ground. In the bottoms on the south side of the river, below the mouth of the creek, is another large village site, while just above the delta is still a third, and smaller one. At the edge of the village upon the hill is a gravel knoll, from which we exhumed ten skeletons, two whole pots, etc. As is always the case when interments are made in gravel or sand, the bones were remarkably well preserved. Just back of the gravel pit is a mound eight feet in altitude and one hundred and ten feet in length. In the mound were seventy-nine skeletons, twenty of which were enclosed in stone cists, such as we find at Fort Ancient. Two of the vaults were hollow, the others being filled with loose earth which had settled in through the crevices. In many places in the mound there were three or four layers of graves, one on top of each other. The skeletons resting upon the base line were not incased in stones. Upon the extreme southern edge of the mound were five graves in a row, all heading the same way, and some of them containing two or three skeletons each. A flint

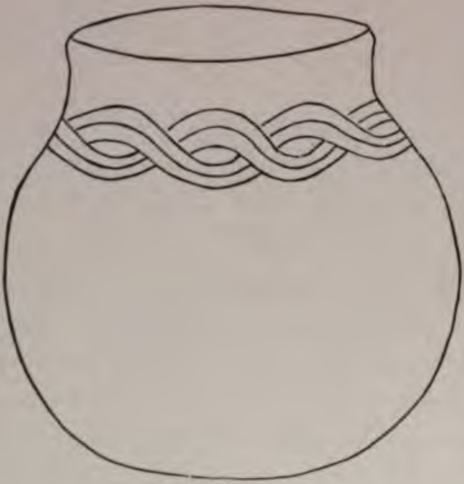


PLATE XXVIII.
Restored Ft. Ancient type of Pottery. 1-3 size.

dagger of fine workmanship, made of chert, double-pointed, and fourteen and one eighth inches in length, lay by the right femur of one of the largest skeletons buried in the tumulus. By the side of one of his neighbors were a pair of antelope horns. This is exceedingly interesting, as we have no historical record of the presence of antelope in the Ohio valley, although we do know that both elk and bison were here. The horns have been either transported from the West, through traffic with other tribes, or the burial was made at a greater period of antiquity than we would assign it.

It is interesting to note the varied methods of burial of these seventy-nine skeletons. Some lay extended, others with knees drawn up against the sternum, and others lay upon their sides. The people making the interment frequently placed the head and trunk of the person in one position, and the legs and arms in another place two or three feet distant.

When the aborigines dug graves in the Old Fort, the burials had to lie on tough blue glacial clay, and because of the formation water was retained and the bones decayed rapidly. Bones in sandy or gravelly soil are more apt to be well preserved. The decayed condition of bones in the Old Fort graves does not necessarily mean that they are older than the valley interments, although the writer is confident that they are older. Both sites seem to be related It is probable that less time and care were taken in constructing burials on the hill. Interments may have occurred after a fight and therefore would be hastily made.

In attempting to estimate the age of the village site in the valley, several things must be considered. There are five feet of earth above the lowest site of village deposit. This may have formed in a short period of time, or it may have been five hundred years in forming. When the river is very high, it overflows the bottoms in which the village was located, and frequently deposits mud or sand in a field. It also takes away sand and mud quite as frequently as it leaves it. One bank of the river during a flood may be built up while the other is torn down. But it is very seldom the river gets high enough to flood this bottom to any considerable depth.

But there were hardly as many floods in the river in early days as now. The same amount of water fell, probably more, but the land was not cleared, and the streams would not discharge their contents so rapidly into the river. Now we have low water in summer, and a flood every spring. Old settlers can remember when the river was lined with heavy timber, and when there were numerous swamps along the bottom lands; and they tell us that the river contained an even stage of water from year to year; that the streams during the winter held much water, but were seldom more than bank full. Trees, logs, and brush, accumulating in the stream, tended to check the flow of the current; the roots of large trees extending down into the water's edge would hold drift and thus form dams. The fact is attested by this: Eighty years ago there were saw-mills on streams now so small they would not turn the least water-wheel. The writer has heard his grandfather and grandmother (who came to Ohio in early days by canal-boat, long before railroads were invented) speak of creeks in the neighborhood of their old home, that once furnished water enough to turn the wheels of several large mills. These same streams now are dry through the summer, but they get very high in the winter and spring.

Now the point is this: The earth over the second or later village site has been deposited by floods during the last hundred years, or since the land has been cleared. The earth (three feet) above the first or lowest village site, and below the later village, has been much longer in depositing, as floods then seldom covered the bottoms for reasons given above. This lower layer is composed chiefly of decayed vegetation, and might accumulate at the rate of one inch in six years, which would give the age of the lowest layer 216 vears previous to the upper one, or 316 years ago: *i. e.*, 1570 to 1575. However, these figures can not be said to be accurate, and we give them as result of

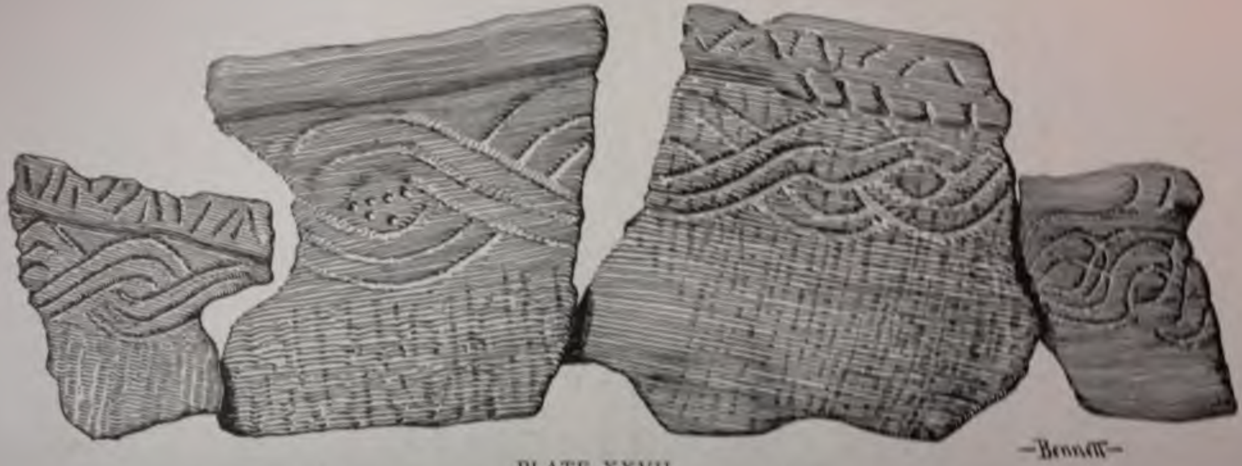


PLATE XXVII.
Fragments of Decorated Pottery, Lower Village Site, Fort Ancient. One-half size.

deliberation after what we uncovered during the course of explorations. Persons who have spent a few days at Fort Ancient, or, as in the case of most observers, a single day, are not qualified to pass upon the problems of age and origin. The Serpent Mound is of such character that it can be seen thoroughly in a few hours. Fort Ancient is so intricate that weeks of study are necessary before one is possessed of anything like complete information concerning it.

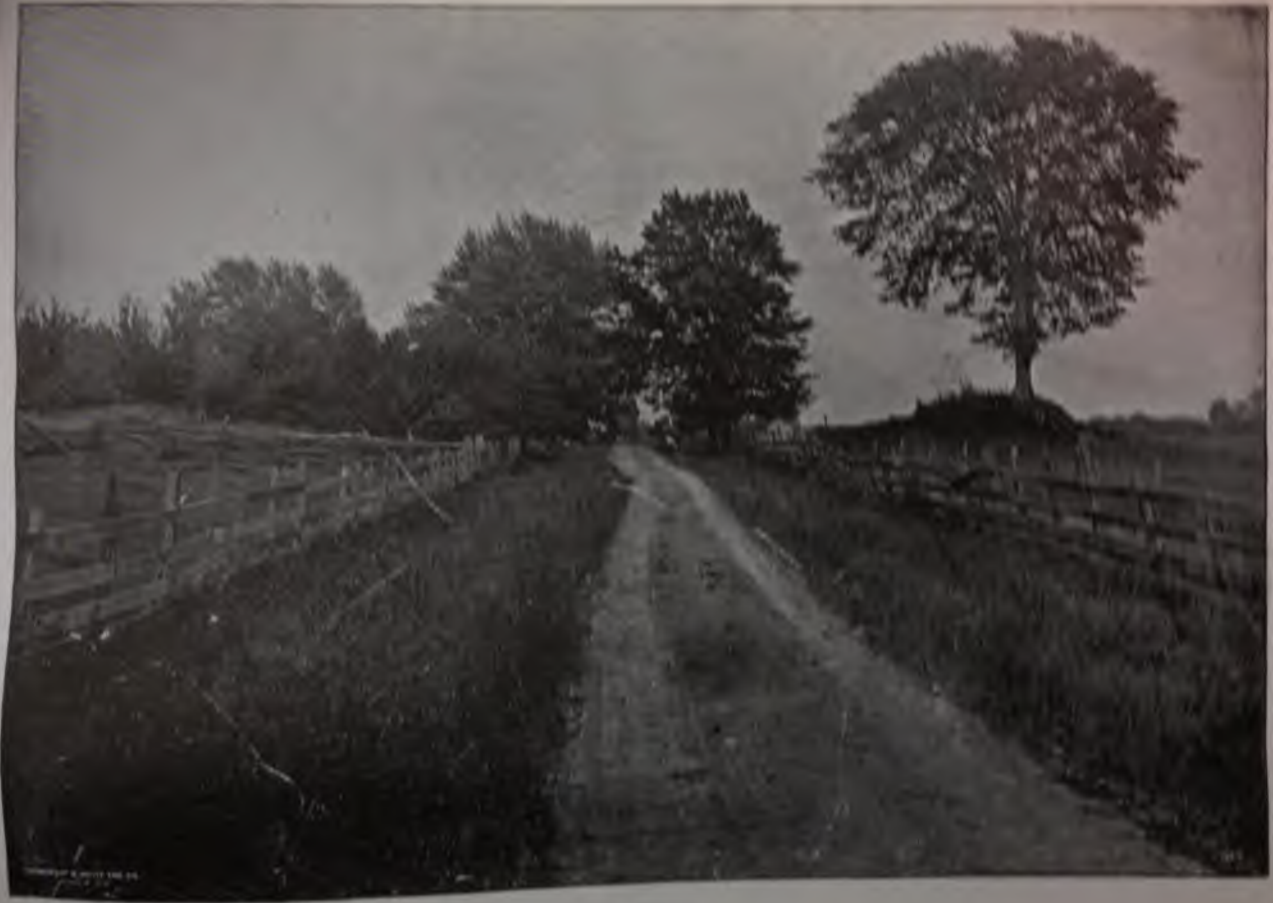


PLATE XXIX.

of the Two Mounds just outside the New Fort. The Parallel Walls

CHAPTER VIII

THE PARALLEL WALLS AND MOUNDS. THE PAVEMENT AND DITCHES. IMPLEMENTS AND ORNAMENTS FROM THE SURFACE.

Just without the walls of Fort Ancient, on either side of the pike, are two good-sized mounds. They are shown in Plate XXIX, page 116. Mr. George Ridge's house is hidden by thick foliage beyond.

When one ponders upon the field work done in the past at Fort Ancient, one is led to conclude that these two tumuli played no small part in Fort Ancient's history. Not only do the parallel walls begin at these mounds, but also the pavement — which has never satisfactorily been explained—also three or four ditches or moats. Atwater seems to have been impressed by the latter—for they were clearly defined in his day. It is difficult to trace the ditches at the present time, and both mounds that lie at the head of these ditches, have been somewhat injured by the state road running between, but, from a careful examination of the mounds, we are led to believe that the edges at the base once came within 60 feet of each other.

Both of these mounds have been opened and their contents carefully inspected by Mr. Fowke. The mounds are 75 feet apart, on each side of the pike, and the distance from station 2 to the large mound on the right is 375 feet. The large mound is No. 69; the one to the left, No. 68. The latter was opened first. For many years it was thought that within these structures the builders had placed offerings to the dead, and a number of skeletons. So the opening of them was looked forward to with not a little expectation by persons residing in the neighborhood of Fort Ancient. But all were doomed to disappointment. The following, taken from my field note book, gives a concise account of the work done in No. 68.

This mound is 10 feet in height, and has a diameter at the base of 80 feet. We began operations on the south side, and ran a wide trench, fully one half as wide as the mound, through for a distance of 40 feet, or until we reached the old diameter on the north. (The old diameter was 40 feet; the mound has been cultivated, and has washed badly, so that it is now 80 feet wide at base. The portion that has accumulated from wash and decay would, of course have nothing in it.)

The mound was found to consist of two kinds of earth—a dark loam and a yellow clay. The clay was piled up first, and then the loam was heaped upon this. The mass of clay is heaviest on the west side; the loam thickest on the east side, thus making the mound symmetrical. At the base line there is a layer, four inches in thickness, of heavy black soil. The remarkable feature connected with this black soil is that ***it has a very offensive odor.*** In over 70 mounds and graves opened during the last two years the writer never before met with such an instance.

Continuing a trench north-east from this mound, the same soil and odor were encountered fully five feet deep. While it is like that arising from decayed flesh, yet it must result from decomposition of vegetable matter. No satisfactory explanation could be obtained. The odor penetrated for some distance and continued during the exploration; was pronounced and caused the workmen inconvenience.

Nothing of consequence was found in the structure — just a few decayed bones (animal) and fragments of finely finished pottery. The mound was not of burial type, and its true significance must remain, for the present, a mystery.

The conclusion drawn from this mound is, that it was built at two periods, that it was "lop-sided" or ill shaped at first, and righted when built upon again. What length of time intervened between the commencement and the completion can not, of course, be determined, but, probably, not much, as there is no line such as would result from decayed vegetable matter between the first and second earth masses.

Mound No. 69:

This one is just across the road from No. 68, and is 12 feet in height, having a diameter at the base of 80 feet. It has not been injured to any great extent by plowing. There is a large elm tree standing near the center and a little to the west, which has served as a protection to the soil.

In Plate XXIX, we are looking toward the East, both structures appearing as they did before exploration. Timothy and flowers grow in profusion and almost hide the larger tumulus.

In the exploration, which occupied nearly a week, pottery fragments were discovered, but no burials and no ash pits or other objects of interest came to light.

THE PARALLEL WALLS

Running due north-east from these two mounds are two parallel roads or embankments about a foot in height and twelve feet wide. These run for a distance of 2760 feet, and terminate by inclosing a small mound about three feet high. In 1901 we explored this and found nothing. These parallel embankments have been almost entirely destroyed by being cultivated for many years; they are only visible where fences run over them, or where a road crosses. They are 130 feet apart.

In 1820, when Atwater surveyed the fort, these parallel walls were very plain. We traced and measured them, however, with as much pains-taking fidelity as possible — as we are persuaded that the next survey of Fort Ancient, if made as long after ours as this is distant from that of Squier and Davis, will find that every vestige of the walls has disappeared. There is nothing between them except the stone pavement, which extends for a short distance. There is nothing peculiar about their construc-

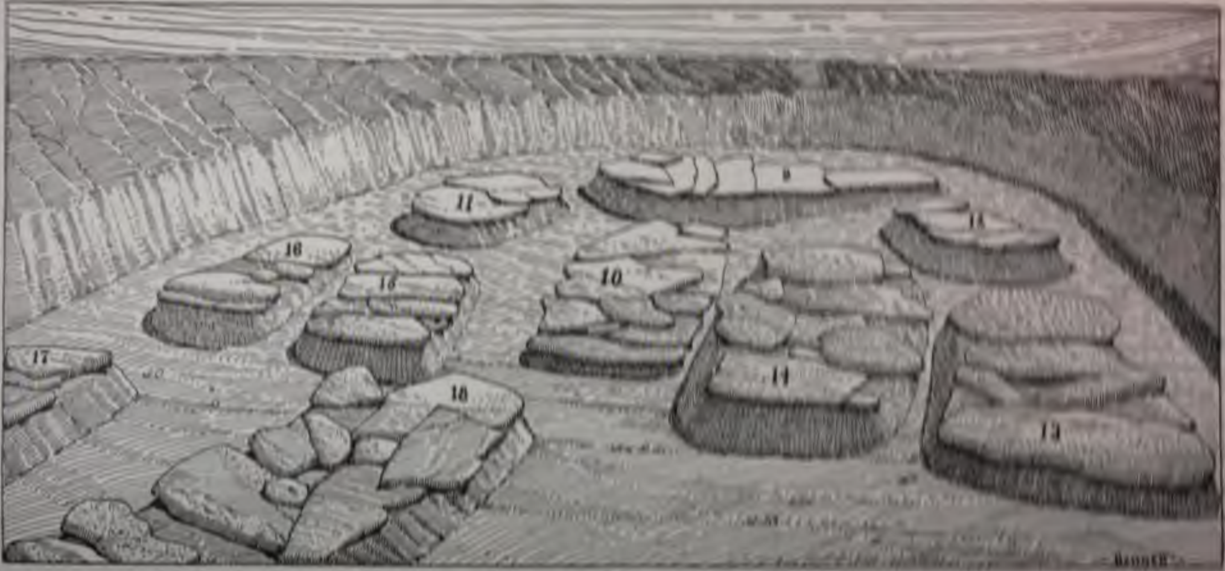


PLATE XXX.
Group of Graves from a Cemetery near the River.

tion, there being no stone in them. In places the walls appear to have been burnt until the ground is very red.

Where the two mounds are (at the western extremity of these parallel walls), there begins a most remarkable stone structure of aboriginal workmanship. This stone pavement is the most interesting part of Fort Ancient The following description is taken from my note-book, and was made while we uncovered the stones, and examined this wonderful relic of departed ages.

THE PAVEMENT.

Thursday afternoon, September 12th, we took our force and went into Mr. Ridge's house-yard, to seek the stone pavement, of whose existence we had heard from various sources, but which none of us had ever seen. Some of our party were skeptical touching the matter, others were persuaded that something there was, and were inclined to test the truthfulness or falsity of the reports. An excavation four feet in width and ten feet long was made, and one portion of the pavement was actually laid bare. We found at a depth of twelve inches a considerable quantity of fine gravel, which had been filled in between the stones, and which seems to have been intended to secure evenness of surface. The pavement is laid with limestones, which were probably brought from the ravines and creek-beds in the neighborhood. The stones average a foot in length and six inches in width. Some of them are larger, and others of less dimensions. Some of them are about two or two and a half inches in thickness, others not more than an inch and a half. The pavement rests on the original surface, the clay being 14 to 15 inches below it. It is supposed to have been on the surface, of course, and the earth above is due to vegetable decay and the accumulation of debris. Some of the stones give evidence of having been subjected to the action of fire, but most of them show no trace of heat. The use of this pavement is wholly conjectural. We venture the opinion, however, that it does not imply any great ceremonial or religious purpose, but was designed as a place of amusement, or of assembly for the natives. It would always remain dry, while the surrounding ground might be wet and muddy.

Its area, approximately, is 130 by 500 feet; large enough to accomodate hundreds of persons. The natives may have held dances on this platform, and the mounds, being near the parallel walls of the way, would afford an excellent position for on-lookers, and for the squaws, who would beat tom-toms, and accompany the dance with their usual doleful singing. Or, it may have been used for the practice of games and athletic exercises, such as are common to the race. This much, at least, we may safely affirm: that the pavement is artificial, and that it is of great archæological value; perhaps of no great ceremonial significance, but still one of the most interesting features connected with Fort Ancient. We believe this is the only instance of ancient pavement proven beyond a doubt in the Mississippi valley. There are many other places where there is stone in connection with aboriginal structures, but there is no place where these assume the shape of a regularly laid pavement. The plow has greatly disturbed in a number of places a few of these stones, but most of them are as they were placed at first. They seem to have been slightly worn on the upper side, as if they had been used for many years as an assembly-ground.

The earth, which has accumulated over them, would give them an age of several hundred years at least. Of course, these stones once lay upon the surface, there could be no object in covering them up. They must, therefore, have been covered by time alone. The earth in a forest accumulates rather slowly, and, allowing ample margin for any error, we are safe in saying that several hundred years have rolled by since the pavement was used. We would place the date about the year 1400 or 1430. This is, of course, merely conjectural.

We find no evidence in any other portion of Fort Ancient, that a pavement has existed. We find a great deal of stone work here and there, but we think this is the only place where there was an "assembly floor" built by the aborigines.

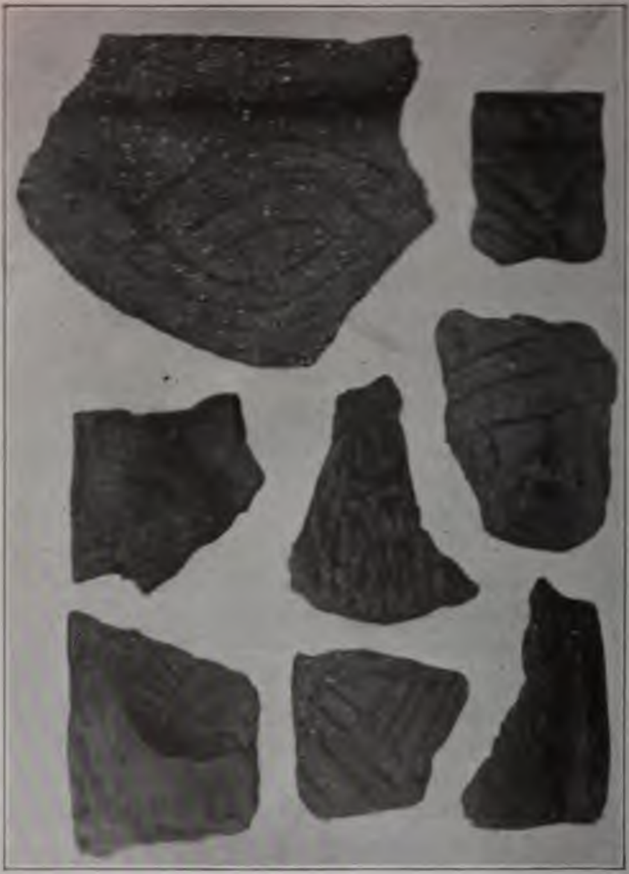


PLATE XXXII.
Decorated Pottery from the Village Sites.

Mr. Hughes says that fifty-five years ago, when he first saw the pavement, there was as much earth accumulated over it as there is at the present time.

SURFACE FINDS.

There are several places within the fort-walls and in the immediate vicinity, where there is evidence on the surface that a great many flint implements have been chipped and made. The place where these chippings are most abundant, is on Mr. Ridge's farm, about 200 yards from the fort wall (station 0), north-east. From the two mounds at this point runs a ditch north-west, and from this ditch, for the space of 100 yards north-east, we find many flint flakes, cores, etc. There is no flint found in the neighborhood of Fort Ancient, and so the flint flakes and disks must have been brought from a distance. We find a great deal of broken flint of the variety found in the quarries on Flint Ridge, in Licking county, Ohio We also find a great deal of dark gray, or nearly black flint, which has been brought here from some locality foreign to Ohio. It seems probable that the residents of Fort Ancient, considering they did not have implements enough in case of a siege, kept stores of raw material, such as could be worked up into a desired shape at short notice.

A great many large flint disks or blocks have been found in the field north of the fort. These disks and blocks are frequently large enough to make several large spear-heads, say six inches in length. Or, if the blocks were broken up, they would furnish sufficient material for the manufacture of forty or fifty arrow-heads. These blocks have been worked out roughly in Indiana, or at Flint Ridge in this state, and transported to Fort Ancient in large quantities. The flint was not brought in rough pieces, as when freshly broken from the ledges. It was worked down partially until it had a regular outline. These worked objects are usually over six inches in length, and weigh from one to four pounds. We call them blocks when not round, when of a circular appearance they are named disks.

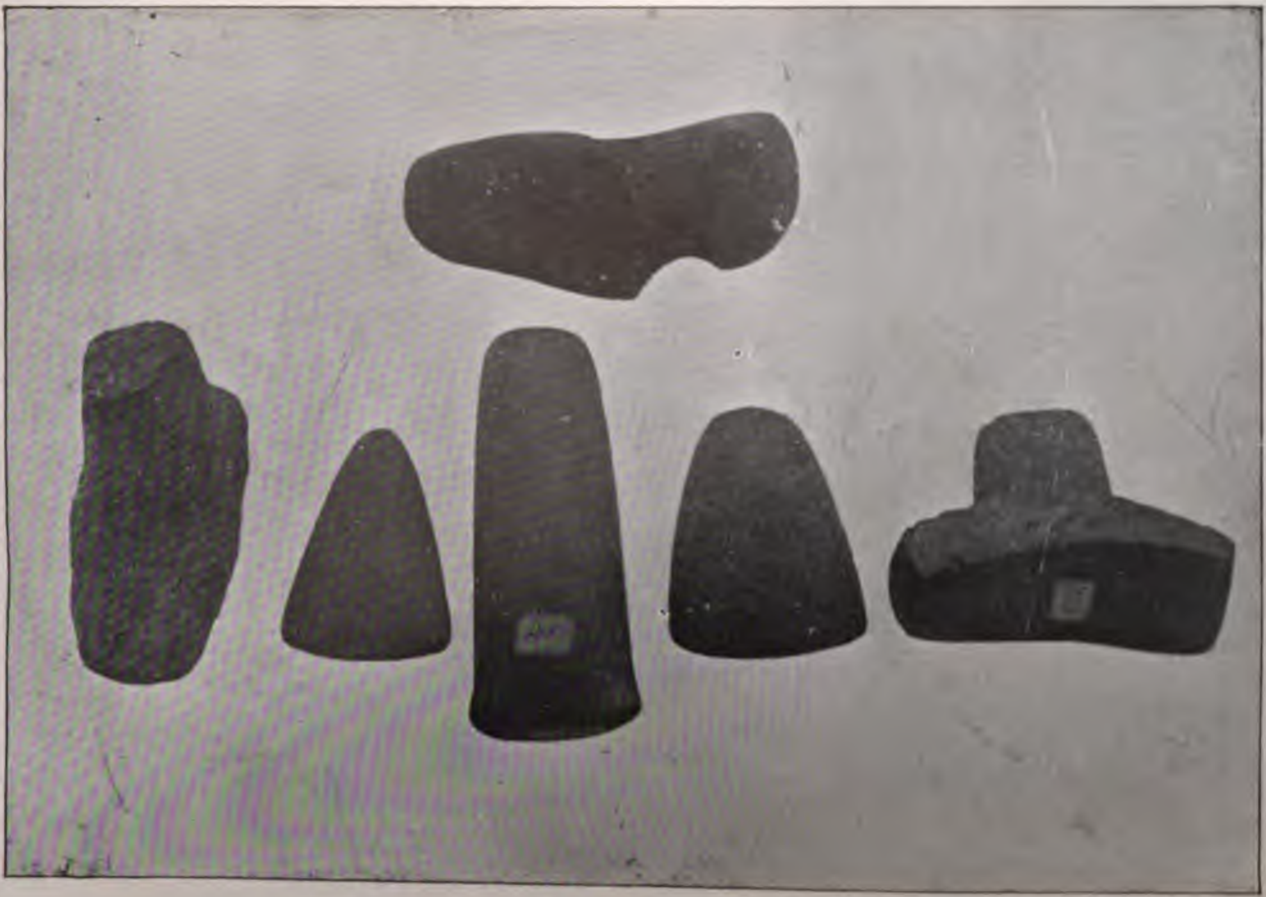


PLATE XXXIII.

Axe, Unfinished Pipe and Celts from Old Fort. Surface Finds.

There have been several quartz arrow-heads found in the surrounding fields, which would indicate that the people here had communication with southern tribes, or that southern Indians passed through this region. But perhaps the quartz was obtained by trading with these natives from the south, although it is possible that some southern tribe visited the Fort.

It is affirmed by farmers that in the past many more objects such as projectile points, axes, pestles, hammers, discs and ornaments were found than at present. Students from Lebanon, collectors and tourists—and they came by the score each month during summer and autumn — have searched the fields every season. The Israel Harris collection, formerly in Waynesville and now in the Smithsonian Institution, private exhibits in Lebanon and other cities contain large numbers of Fort Ancient material. All of this tends to indicate a considerable population at one time, or a smaller number of aborigines during generations. The historic Shawanoe sites in Ohio yield a dearth of surface-found objects compared with Fort Ancient.

I suppose that nearly fifty thousand specimens have been taken away in the past century. Counting the objects in museums, those dug up or found by the surveys, numbers carried away by visitors, some that have gone abroad, and the thousands that are in the hands of private collectors, in the immediate neighborhood of the structure, this seems to be no exaggeration.

The problematical forms shown in Plate XXXIV, page 128, present a variety of shapes. At the top are two sandstone objects (all these are shown about two-fifths natural size), which have grooves and depressions. The one to the left has depressions that resemble finger-marks; the one to the right as if a tool of copper had been sharpened upon its surface. These were found in the Old Fort.

No. 807 was found in 1884, and is a heart-shaped ornamen of red slate. It is finely finished, polished, and worked quite thin.

To the right of the heart-shaped object is an ornament of banded slate, having two perforations. This was found in a grave by a farmer residing near the walls of the fort.

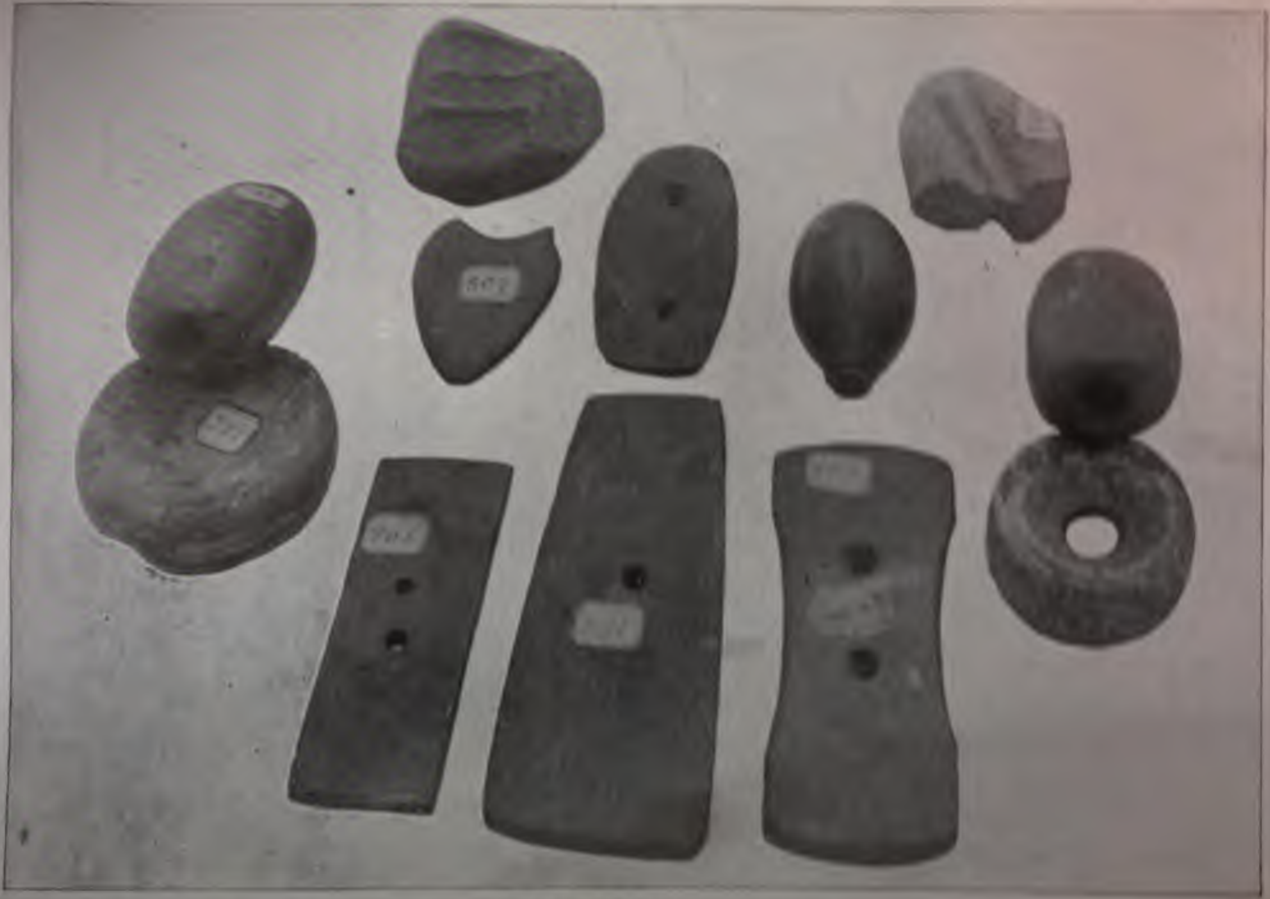


PLATE XXXIV.

Problematical Objects, Tubes and Ornaments. Surface Finds. Old Fort and Middle Fort.

The plumb-shaped object next to it, is of blue slate, has a groove cut around the upper portion, as if it may have been used for suspension around the neck, similar to an ornament.

Lying elevated on two stones are two tubes or hollow cylinders of slate well bored and presenting a symmetrical appearance. They were found in the New Fort.

No. 799 is a paint cup of soapstone found in a grave in 1884.

To the right is a small discoidal of white limestone. Several of these discoidal stones have been found near the Fort, and one or two large ones are owned by a gentleman in Lebanon, O.

Nos. 905, 881, and 897 are all black or banded slate ornaments of superior finish and large size. There seems to be quite a number of objects of this class found within the walls, and it is a noteworthy fact that they are always of superior workmanship, seldom broken, and occasionally unfinished. In any large museum collection the percentage of broken problematical forms is larger than of perfect forms. The Fort Ancient types are therefore peculiar.

Plates XXXV and XXXVI portray the finest problematical stone ever found at Fort Ancient. The material is black slate, very hard and quite close grained. There are two grooves on the face and back of this object. One runs from the top down about an inch and one-half, the other runs straight across. In the angles formed by these two grooves are two perforations extending through the stone and drilled from each side. At the bottom is an oval-shaped hole on the face extending through. This latter perforation does not exhibit the oval shape from the rear, but presents a round appearance. Around this oval-shaped depression are 14 holes, each drilled about one-eighth of an inch deep. They present the form of an arrow-head, or of a heart. We are of the opinion that they are intended to represent the form of an arrow. On the reverse side, are two holes above the oval perforation which are not drilled through the stone, and which lie close to it just under the horizontal groove. The remarkable part of this stone is that the symbol, three,

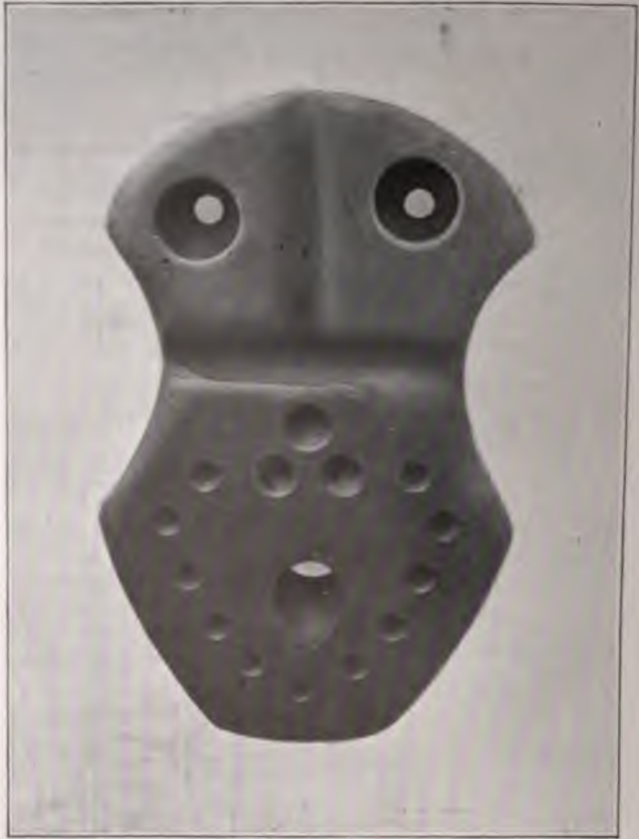


PLATE XXXV.
The "Owl Ornament"; found in a Ft. Ancient Grave in 1882.
Front View. Full size.

occurs on it in three places—on the face twice, and on the reverse once. The farmer who sold it to the writer in 1884 claimed that he took it from a grave near the Great Gateway in 1882.

Plate XXXVII illustrates a grooved axe above, three celts in the centre, all of which are typical Fort specimens. At either side are two unfinished platform or monitor pipes of Catlinite. These latter were found two feet below the surface in the Old Fort, and lay together. There is nothing to indicate them to be modern. Although of Catlinite, they are of the mound pattern and appear to be old. They are in the museum of the Ohio State University, as are most of the specimens shown in the Plates illustrating objects.

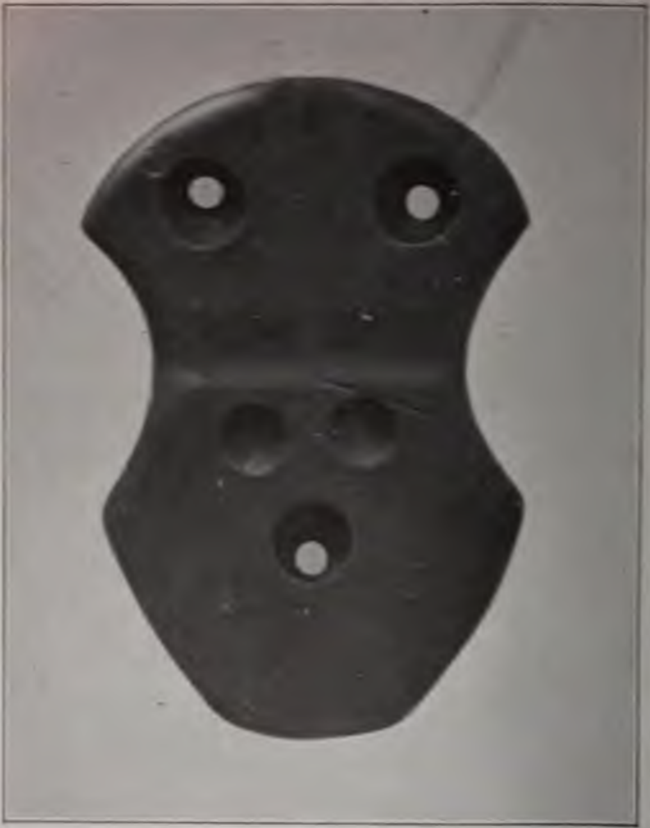


PLATE XXXVI.
Rear of "Owl Ornament".

CHAPTER IX.

THE FORT ANCIENT CULTURE. EXPLORATION OF OTHER MOUNDS, ETC., IN THE LITTLE MIAMI VALLEY.

The entire Great and Little Miami, and the Scioto Valleys, present two cultures. These have been referred to frequently in the writer's previous publications and field work, 1887 to 1898. Professor W. C. Mills began work in the same region in 1898 and his explorations have added much to the knowledge of ancient tribes in Ohio. He has designated these two cultures by appropriate and brief names: — The Fort Ancient and the Hopewell — each standing for something different.

While the Hopewell culture is confined to the Scioto and such tributaries as the two Paint Creeks and does not seem to extend above Columbus, the Fort Ancient included the whole of the Miamis above Milford and East Fork, Brush Creek and the watershed dividing the Miami and Scioto basins. The stone graves and mounds of this region, even fifty miles from Fort Ancient, are strongly of that type and not of the higher Hopewell character.

In preparation for the writer's conclusions, it is therefore necessary to reprint here certain explorations of the territory east and south-east of Fort Ancient.

In 1890 some weeks were spent in Clinton County opening mounds upon Cowen's Creek, Todd's Fork, and other streams. Of one mound the Field notes state:

Scattered through the upper part of the structure were many pieces of flint broken and partially worked. They were of a grayish-white color. The earth forming the structure had been scooped from the surface of some village site, hence the presence of flint flakes and blocks. One small spear-head of pink and white quartz was taken from a small ash-pit midway between the summit and the base. Implements of such material are rare in southern Ohio.

Near the exact centre of the mound, about eighteen inches from the surface, was found a small tablet, five by

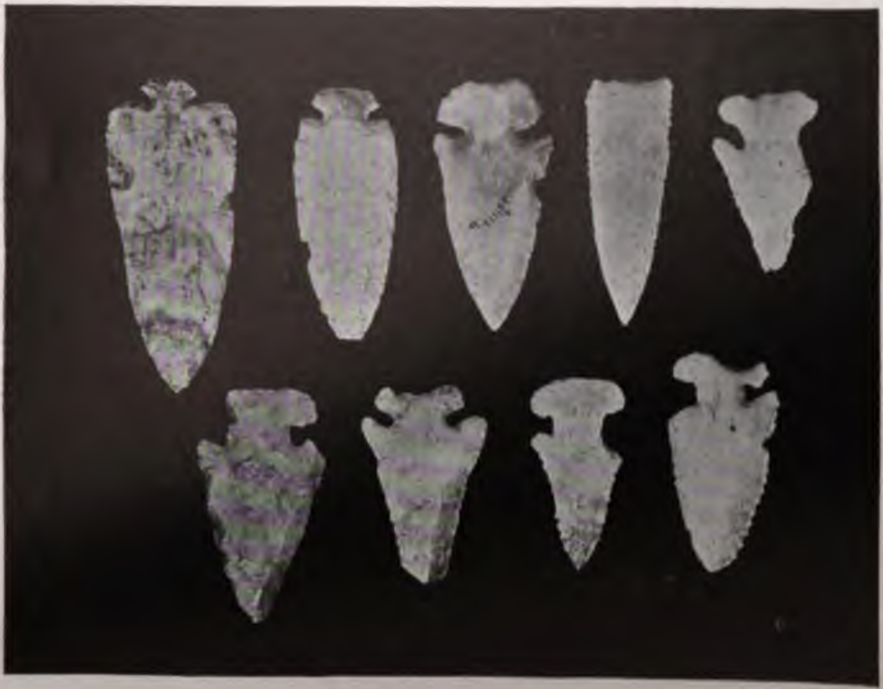


PLATE XXXVII.

Types of Spear-heads from Fort Ancient. Phillips Academy Collection. Size, 1-4.

four and a quarter by three fourths of an inch, composed of sandstone. This remarkable object was taken from a mass of sticky, yellow clay, its position being carefully noted by the six persons present. Upon two sides were three grooves of the same depth, similar to those upon the back of the famous "Guest Tablet" found in a mound upon the site of Cincinnati during the early part of this century. Along both the narrow edges were two shallow grooves, while on the ends were two short but deep grooves. The depth of the various grooves range from one sixteenth of an inch to one third of an inch. The tablet has the appearance of serving the purpose as a sharpener of bone or copper tools.

The mound is presumed to be a house site, as posts extended into the structure to a depth of three feet and formed a square twelve feet on each side. The posts were burned and charred so that little remained of them. Near the tablet were two pockets of charcoal and also a large limestone, fourteen by sixteen inches, polished upon one side. The latter may have been used for grinding corn, as scratches seen upon its surface are rotary in character and may have been made by a stone pestle.

Another tumulus, 57 x 45 feet, was erected on a hard burned floor. Three skulls, entire, and three cremated skeletons, a fine gorget of diamond shape and other objects were found.

Other mounds yielded a few copper bracelets, ornaments, and projectile points. No altars, no pipes, no mound-groups, no caches of implements were found.

Passing up East Fork of the Miami into Clermont County, we are forty miles southeast of Fort Ancient. Here work was done in May, June and July, 1888.

As the size and number of the mounds and earthworks seem to be in direct ratio to the fertility of the soil, we would not expect to find within the area drained by the East Fork so many large mounds as are to be seen in sections more favored by nature, or to obtain from them such a number and variety of specimens conforming to aboriginal ideas of utility and beauty. Investigation confirms the belief.

A small mound, 25 feet diameter and 2 feet high, on Mr. Shumard's farm, Stone Lick Tp., was opened. A layer of charcoal extended through, one foot above the base line. There was a floor or pavement of limestone slabs beneath, composed of stones 20 to 30 inches long, about a foot in breadth. These stones were thick and heavy,

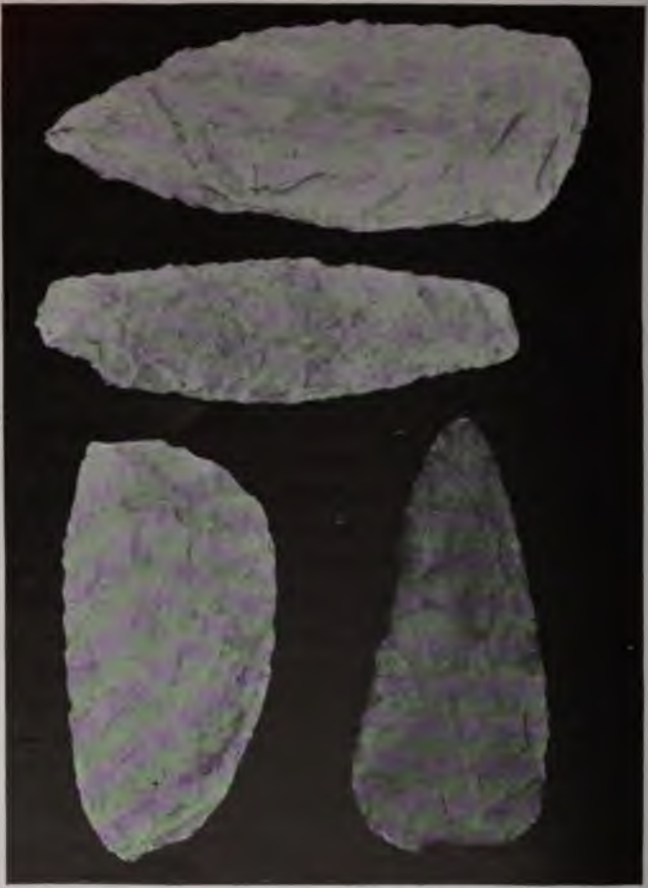
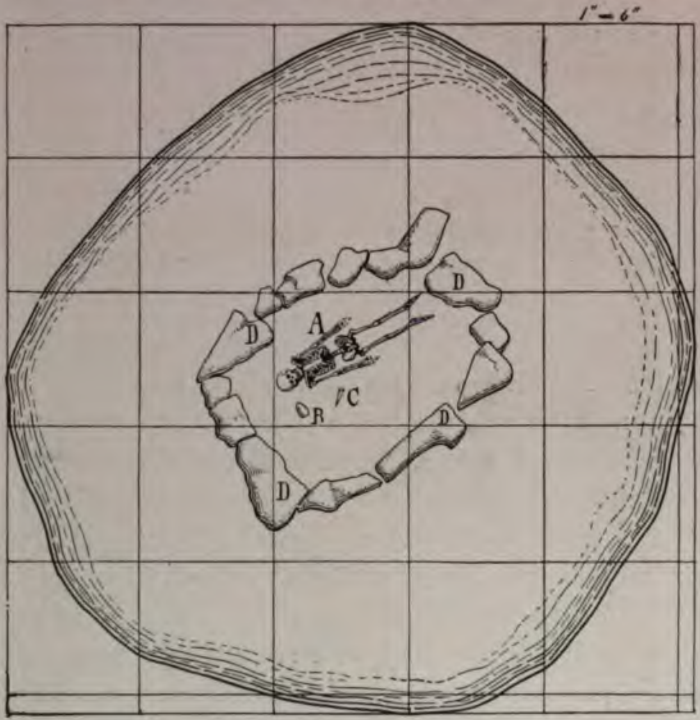


PLATE XXXVIII.
Fort Ancient Flint Knives. 1-2 size.

and weighed perhaps forty or fifty pounds each. This pavement measured nine or ten feet in breadth.

On taking away the stones at the central portion, we found a layer three inches in thickness of common soil, covering a skeleton of medium size (A in the figure). We removed this dirt, which had evidently been placed to prevent the stones from coming in contact with the body, and thus endeavored to secure the skull. Although the greatest



PL. XXXVIX.— Ground plan of mound No. 1. Skeleton surrounded by stone slabs. See page 136.

possible care was exercised, atmospheric agencies had reduced the bones to such a fragile state that their removal was an utter impossibility, and we were unable to preserve any portion of the skeleton save the lower and upper jaws and some fragments of the skull.

Near the right side of the skeleton lay a small polished bone awl or perforator (C in the figure): about twenty inches from the right shoulder was a finely polished celt of greenstone (B), four and a half inches in length and two and one fourth wide. Underneath the body was a mass of red ochre.

Stone graves are numerous in the region and several were opened, but these seemed to be of the Fort Ancient type.

In Adams County similar graves have been opened in 1894 and 1896 by the writer, and in 1907 by Mr. Coover. There are large numbers of them scattered through Pike, Clement, Brown and Adams Counties.

A mound on Mr. Harvey Anderson's farm, Marathon Tp., contained burials and implements. Near the centre of the mound a pit had been dug to a depth of nearly two feet below the original surface, and the sides of it burnt quite hard: this was filled with ashes, fragmentary bones, and calcined limestone, intermingled with which were a few mussel shells, pottery fragments, and pieces of deer antlers. Just above it was a slab of limestone fifteen inches wide, and nearly three feet long, which had been almost disintegrated by an intense heat. Adhering to the upper side of the stone were portions of ribs and traces of vertebrae, burned until they were scarcely distinguishable. It was plain that a skeleton or body had been placed on this stone, and then cremated.

Another mound in Perry Tp. covered two burials and some artifacts. One of the skeletons was partially covered by a

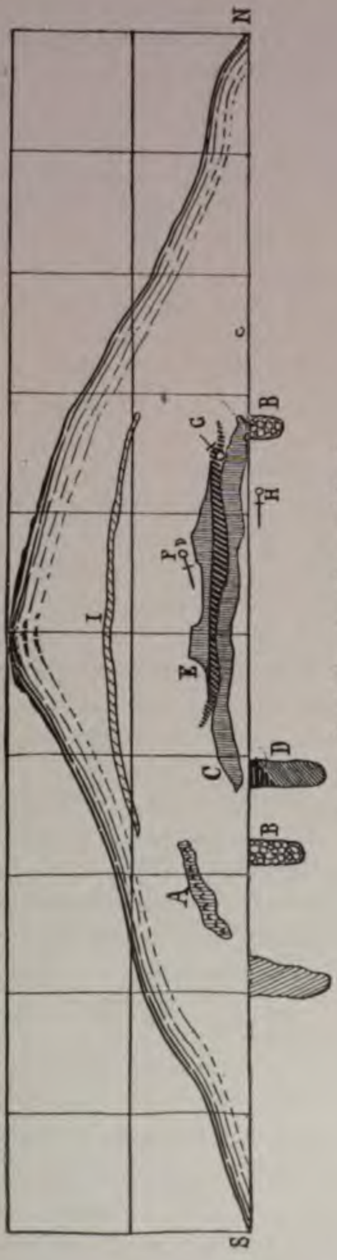


FIG. XL.—Vertical section of mound No. 6.

layer of mica, consisting of forty-one sheets, the edges of which had been slightly trimmed to give them a more regular outline. They occupied an irregular space of about two by three feet and were so placed that the edges somewhat overlapped in the same manner as scales on fish. A single piece lying to one side, was much larger than the others, being five by eight and one half inches, and half an inch thick. The skeleton itself was so decayed that no portion of it could be recovered.

A careful examination of the entire tumulus disclosed nothing more than the objects mentioned.

MOUND NUMBER SIX.—The mound about to be described lies upon very high ground and overlooks the East Fork.

In company with the mound described, it is on Mr. John Boyle's farm, Brown County, near St. Martins. At time of excavation it was 7 feet high and 70 feet base, surrounded by a circle. (See Plates XL, XLI.)

Post holes were numerous, and formed a circle about the base. Charcoal and calcined bones (A in figure) were numerous. The post-holes — unusually large — were 20 inches across and 14 to 16 inches at the bottom, three feet deep, and filled with small, flat, slightly burned pieces of limestone, weighing from two to three pounds each; they are shown at B in the figure. The spaces between the stones were tightly packed with earth which had also been burned. No relics or remains of any kind whatever were placed with them.

While, as before mentioned, these pockets are of frequent occurrence, in all our experience of mound opening we have never met with another instance in which they were completely filled with burned stones; nor can we recall a similar example in the reports of other explorers.[1]

As we proceeded with the trench a heavy layer of earth was discovered (C), burned until the upper surface had become a bright red color; this lay about six or seven inches above the large pockets, and was separated from them by a mass of very fine black earth (D).

The clay composing the burned layer had been placed in the mound when in its natural state, and a fire kept burning upon it for a considerable time. The earth above showed some evidences of the heat, as though it had been piled on while the clay was still very hot; but owing to the thickness of the latter the heat had not penetrated to the black loam below; at least not to a sufficient extent to produce any alteration in its appearance.

When we reached the centre of the mound we made the most important find of the week. A rough altar of hard burned clay, represented by E in the figure, had been constructed six inches above the burned stratum, and resting upon a little mass of charcoal. It was oval in outline, measuring seven by nine feet, the longer axis being east and west, and was ten inches in height. The upper surface dipped slightly from the edge toward the centre; extended upon it at full length, with head to the east, lay a skeleton (F). Both the skeleton and the altar were unusually well preserved, but the latter was so thin and soft that it was impossible for us to remove it; an enlarged view of them is given in Fig. XLI.

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[1] Since the above was written pockets filled with burnt stone were examined in the Hopewell group of mounds, Ross County.

There was copper plate above the forehead. When the find was made its true significance did not appear to me. The builders of this tumulus, I am persuaded, knew of the Hopewell culture—of the Scioto tribes. And they tried to imitate an altar burial. Whereas the Scioto people burned what was placed in the altars, these people put in the skeleton and did not burn it; they constructed their altar on different lines, did not burn it hard and made no offerings. It is probable that they were on the borderland between the two cultures. The mound is of interest and importance because of this altar burial.

It is unnecessary to speak of other interments and objects —although nearly a score of mounds were opened.

We have looked at tributaries, let us examine the Little Miami Valley itself. The entire Little Miami valley above the locality of Fort Ancient, beginning far up the stream at Cedarville Cliffs, in Greene county, and extending down to its junction with the Ohio river, might be said to have been occupied throughout by primitive man. We find mounds upon the hills that line the river on each side. Numerous village sites occur as we descend, and here and there we find, on some plateau, a circle or a fortification.

At the cliffs of the Miami, there is a large mound, 31 feet in height; and a small inclosure, with a number of gateways, on Massie's creek. Coming further down the river, we encounter, in the neighborhood of Xenia, a number of mounds, and one large tumulus, inclosed by a circular embankment.

Down the river further, at Alpha, we find a number of small mounds on the hill-tops bordering on the stream.

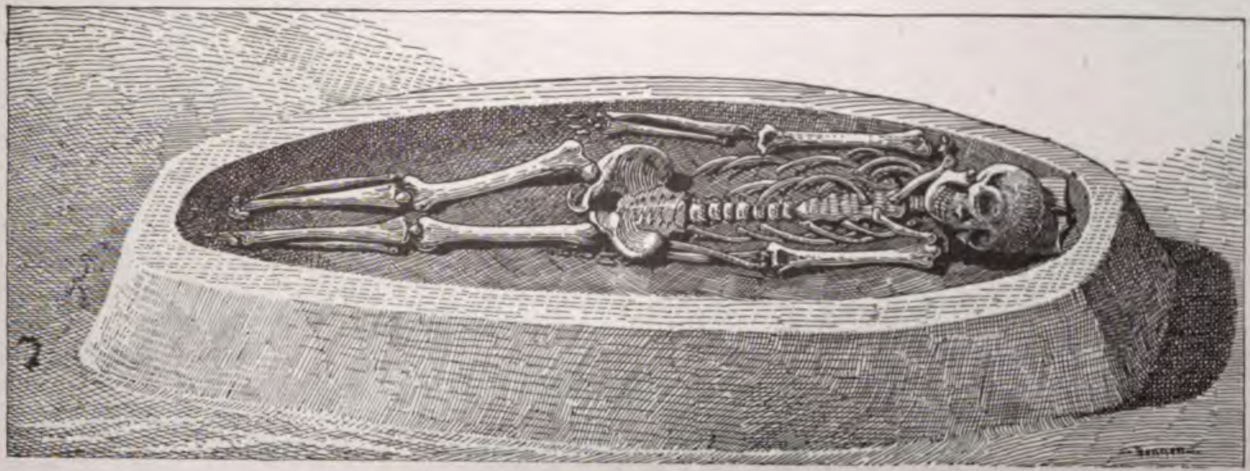

PLATE XLI.
Skeleton from Boyle's Mound, and Depression in which it Lay.

At Spring Valley there is a mound inclosed in a circle. This was opened about ten years ago, and many skeletons and interesting relics found. At Waynesville there is a small cemetery on the east bank of the river, where some 45 individuals have been dug out at various times. Below Waynesville we find several mounds, two large village sites, etc. At Oregonia (formerly called Freeport), there are several mounds and two large village sites. These latter have been productive of great quantities of bones, shells, beads, etc. Passing Fort Ancient, we come to Mill Grove, where the hills are in places covered with many stone graves, and where there are a number of small mounds. At Morrow, we are told, skeletons have been found, and at South Lebanon there is a fort, square inclosure, circle, and small mound. The mound was opened in 1877, and yielded many skeletons, and some very large and beautiful copper axes. There were nine of these axes found; they weighed about three pounds each, and were made of the Lake Superior copper, which was beaten out in the cold state; they are now in New York City.

At King's Mills several skeletons have been found, and at Foster's Crossing there is one mound and a good sized inclosure. We have been given the following description of it: It is on a high hill back from the river, and incloses 12 or 15 acres. The embankment once stood about 10 feet high in the highest place, with an average of six feet. There is some stone in its construction, but not much. In places there appears to have been a hot fire, as the earth is burned to a considerable depth. There are numerous gateways; the embankment now stands about three feet high and twenty feet base. The cemetery at Madisonville, in which Harvard University has explored for a generation, yielded thousands of skeletons and is not exhausted. It is too familiar to need description here.

Near Fort Ancient, two monuments exist that have not been mentioned in preceding pages. Directly opposite, on the west bank of the river, and on fully as high hills, there is a small circular embankment composed entirely of earth, and a moat on the interior. The circle if three feet high, 160 feet in diameter, and the moat two feet deep. The width of the embankment composing it is about 10 feet. There are few artifacts found in the neighborhood of the circle, and no stone in its construction. It overlooks the river on one side, and on the south there is a deep ravine flanking it.

Back of Fort Ancient, on the plateau, and one and a half miles to the south-east, are three good sized mounds. The first one was dug out a year ago, with the following results: A roughly laid stone wall was near the outer edge of the mound, and extended entirely around it. Within this stone wall, with their feet toward the center, lay 15 skeletons. Near one skeleton were some twelve curious ornaments of bear teeth, with perforations through them. They have the same curvature on the sides that the tooth has before it is altered, but they are flattened at the edges somewhat, and the point of the tooth, or crown, has been filed off, and the ornament made quite sharp. The teeth that were unworked, save for the peforations, were of the average size of the black bear, and had from two to three holes in each.

CHAPTER X.

CONCLUSIONS ON FORT ANCIENT

Deliberation upon the studies of Fort Ancient made in past years leads one to certain conclusions. These may not be clear except to archaeologists who have given the enclosure some thought, for Fort Ancient by its very nature is a place not to be understood save after many visits. But one is of the opinion that given the same length of time in exploration, other observers might concur with the writer in his general conclusions, and differ in unimportant details. Until May of this year the writer has purposely refrained from seeing it and ten years have passed since his last visit. Therefore a retrospective view may not be devoid of small value.

That it is defensive most persons will admit, although military men, measuring it by modern standards, observe many weak points.

That it is 800 or 900 years old, the writer firmly believes —yet there are some who will not accept this statement.

Historic tribes knew naught of Fort Ancient, and no modern Indian village was nearer it than "Old Chillicothe", in Greene County (the site of Kenton's and Boone's captivity), 25 miles north. There are ***no*** stone graves at that Chillicothe, or at Frankfort (Chillicothe-on-Paint-Creek), or at Cornstalk Town —40 and 50 miles distant. The Shawanoes lived in numbers at all of the above towns. This fact is rather significant, for Dr. Cyrus Thomas took exception years ago, to the writer's statement that the Fort Ancient stone graves were not Shawano. At that time my contention was based on the age of certain large trees. To some minds this is not a sound argument, yet it must be borne in mind that while some trees grow rapidly, others do not. However, supposing that ***none*** of the Fort Ancient trees are old, (which I do not believe) I shall present the matter in a different light. One would suppose that the mortuary and other arts at Fort Ancient would bear striking analogies to the culture of Shawano sites, if Fort Ancient people were related to those Indians. On the contrary no such similiarities are noticed, and Fort Ancient and Madisonville are identical: not Fort Ancient and Shawano sites. Again, limestone slabs abound near the Chillicothes, yet no graves lined with them — no stone graves whatsoever — have been discovered. It is likely that no Shawano people ever lived at Fort Ancient and the writer is persuaded that his original statement to that end is correct.

Fort Ancient does not appear to be southern in the sense that the Scioto Valley tribe was influenced by southern culture or vice versa. Flint Ridge flint and local chert abound. Tennessee nodular flint is rare. The 8000 flint discs found in mound No. 22 of the Hopewell Group are probably from Little River (Tennessee) quarries and indicate a close connection between the Cumberland–Tennessee peoples and the Hopewell tribe. Not so at Fort Ancient. Aside from some white quartz points and chippings there is little of foreign origin. Even northern copper is rare, galena and obsidian are absent: ocean shells, pearls and mica — save a very little mica — have not been found.

Professor Mills obtained from a farmer some copper ear-ornaments, pendants and other objects which had been plowed up near the Fort walls. While apparently a cache, it was peculiar in that the mass had been purposely hammered together, so much so that many of the copper objects were well-nigh ruined. One may conclude that this copper did not belong to Fort Ancient people. No sane trader would destroy his own wares and no chief or shaman could bring himself to destroy that which carried more or less religious significance in ceremonies. All copper — judging from the conditions under which we find it in the mounds — was valuable and more or less "mystery". It seems likely that the Fort Ancient copper mass was obtained during a raid by Fort Ancient warriors against the Hopewell culture on the Scioto; or obtained by a war-party from the natives of the "Turner Group", thirty miles down the river.

Having no use for the ornaments of a rival or hostile nation, and to show contempt for such objects as were valuable to the higher developed Hopewell or Turner people, the victors hammered up their spoils. Similar incidents of destruction of property in historic times among warring tribes, are common. The incident of the copper is a further confirmation that the two cultures were separate and distinct, and the tribes hostile to each other. Professor Mills' terms — "Hopewell culture" and "Fort Ancient culture", clearly and tersely indicate the difference.

Madisonville, the large cemetery and village site twenty-five miles down the Little Miami, is distinctively Fort Ancient in its ceramics and stone arts. Yet Madisonville may have been occupied for a greater length of time than Fort Ancient. That is, from the strictly prehistoric down to the historic although the writer is persuaded that Fort Ancient is the older. A study of the Madisonville collections and those from Fort Ancient shows the close relationship. A few glass beads, bit of brass and piece of iron were once found in a Madisonville grave. The quantity was insignificant and it seems to the writer that the grave must have been intrusive, for had Madisonville been occupied in historic times, more than these few European things would have been found.

Harvard University, the Cincinnati Society of Natural History and Doctor Metz have dug there more or less continuously for thirty years. No aboriginal cemetery in America is of such extent and none have furnished such a quantity of material.

It does not seem to me that one should set aside all the thousands of stone, shell, bone and clay objects which are certainly prehistoric, and accept these few things as indicative of modern culture at Madisonville.

Catlin advanced a theory that the Mandans were the Builders of Ohio Valley monuments. In my book, "Fort Ancient", I inclined towards that proposition. But after some study of the Mandan collection at Andover and an inspection of the Peabody Museum Mandan exhibit, I wish to modify the statement made in 1889. If they came from the

Ohio valley, they made a radical change in their arts, for the Mandan implements and pottery — save a peculiar decoration on the pottery — do not savor of Ohio Valley culture. The flint knives from Mandan sites are long and slender, being very unlike Ohio types; axes are quite rare; the celt is not common, and problematical forms as well as the ordinary slate ornaments are wanting. All Mandan implements, pottery, etc., have a fresh or recent appearance. On the pottery, even the soot remains. No Ohio valley specimens appear modern, all are weathered.

The Hopewell Culture extended eight or ten miles up the Little Miami to the "Turner Group", some miles below Madisonville. In 1886–7, Professor F. W. Putnam found remarkable problematical forms in copper, mica, terra-cotta and shell in the altar mounds at this place.

Above Madisonville, or eighteen miles below Fort Ancient, is a hill-top fortification, overlooking the Miami at Foster's Crossing. The Foster's work was partly explored by Professor Putnam and appears to be of Fort Ancient culture status.

Reviewing the entire field of these Hopewell and Fort Ancient cultures, it seems to me that a thorough study of the reports and collections relating to ancient man in southern Ohio, and further exploration in the Muskingum Valley and along the Ohio may prove that local cultures were developed independently of each other and extended over a considerable period of time.

Assuming that the gravel hill or glacial kame burials, common in southern Ohio, are totally different from mound and village site interments — or indicate an earlier tribe — which the writer is convinced is true, one may surmise that early man buried his dead in these gravels, where digging was easy. Moreover, the rounded slopes — almost artificial in character — may have suggested to him presently, the building of mounds. Be that as it may, it is scarcely reasonable to conclude that man began the construction of large earthworks immediately upon his arrival in the Ohio valley. There must have been a long process of development; and the complicated works of the Scioto, while of considerable antiquity, were built after man had learned to construct the simpler hill-forts, circles and what-not. Whether the builders came from the South or the Northwest, or the East matters not. The culture they developed was local and while the objects and art were southern-like in character, their mounds and enclosures were not of the southern type.

What Dr. Thomas has called the "Problem of the Ohio Mounds", is a problem of Fort Ancient and Hopewell and Gravel Hill cultures — not a problem relating to Shawanoes and Cherokees as Ohio mound-builders. If Cherokees and Shawanoes built Ohio earthworks, it was in times of remote antiquity; for certainly neither tribe presented any similarity to Ohio culture in historic times. Cherokee pipes are the antithesis of Ohio pipes. And a careful comparison of Cherokee, Shawano, and Fort Ancient villages reveals nothing in common.

On the sites of historic Indian villages but little material is found The great Illinois town, mentioned often by La Salle and Hennepin, and which contained thousands of Indians, exhibits far less surface indications in the way of arrow-points and flint chips than any of the large prehistoric sites in Ohio. Before the American Association for the Advancement of Science at the Brooklyn meeting in 1894, I read a paper entitled, "An Inspection of Modern Indian Village Sites in Ohio". Two paragraphs are reprinted as follows: —

"Taking Cornstalk town by way of example, the amount of goods distributed by the English in one year amounted to more than $50,000. The town contained (1730 to 1780) more than one thousand persons, and the population was constanly ranging above or below that number as war parties left and councils, assemblies, etc., called in surrounding tribes. It is not necessary for me to enlarge upon the number of iron, copper, silver and lead objects which must have been lost, traded, carried away or buried. It is only important that I should call attention to the singular fact that so few modern implements should be found upon town sites where a population is known to have existed for more than seventy-five years.

"The prehistoric sites furnish pottery, stone, bone and shell relics very like those found upon the modern sites. We must, therefore, conclude that the quantities of such material found upon historic sites indicate that the introduction of more serviceable utensils, weapons and ornaments did not displace the old and more primitive forms, but that both were in common use; or, that the ancient forms and the rough pottery sherds and rude stone relics marked the site of towns which existed before the advent of the traders; or, lastly, that the use of native material was not abandoned for the newer utensils. In any event, we must accept the proposition that nearly all of the relics left by the traders have either disappeared or resolved themselves into dust as a consequence of the action of the elements, or were so well cared for as to be taken away by the tribe on their removal from the locality. The finding of an occasionally rusty knife blade, pieces of iron and gun lock would indicate that the latter contention is not established."

No observer who has spent time in fieldwork will deny that the prehistoric sites furnish much more evidence of occupancy and activity than the modern.

The writer is convinced that Professor Mills' explorations in the "high-culture" groups of the lower Scioto, and his own diggings at Hopewell and elsewhere indicate that Squier and Davis were not so wrong in their conclusions as has been claimed by writers who have never seen a "high-culture" group explored.

Again, the enclosures at Fort Hill, Glenford, Spruce Hill and similar places are more nearly like Fort Ancient in conception than the valley works. Later detailed exploration may indicate that the hill forts were not of the culture of the geometric works in the river valleys and that the Fort Ancient people were concerned in their construction. This is, of course, conjectural but by no means are all the indications against such a theory. We have but begun the right study of the "Problem of the Ohio Mounds". It is not a problem of variation of a few feet in the accuracy of a square or circle as given by Squier and Davis. The plow will account for such discrepancies. Neither is it a problem of "high civilization" — which nobody of intelligence believes at the present time. But it is a problem nevertheless and it will be years in working out, for it deals with details and observations such as must be made in the field.

Fort Ancient's builders appear, from all available data, to have occupied a territory seventy miles north and south, eighty miles east and west. The Great Miami valley presents Fort Ancient culture — it is not of the Scioto. We may surmise that they were hostile to Hopewell or kindred peoples. That there was much difference in the age of the Scioto and the Miami works, I doubt, although it is possible that Fort Ancient is older. Extensive explorations in, and a study of the pottery and implements found in the ditches leading north and south from the mounds just east of the New Fort, may shed light on the problem. If no Madisonville type of pottery is found in these ditches, we may conclude that the people of the valley villages were like Madisonville natives in art, but the dwellers in the Fort belonged to a different tribe. The ditches are a part of Fort Ancient and were open, of course, at the time the Fort was occupied. Therefore I hold that what is taken from them, and also from the village in the north end of the South Fort — in the woods, where original conditions have been preserved — may furnish significant testimony. It has been intimated in my previous articles on Fort Ancient that the excavations on the hill should be more thorough — particularly at the points named. Much repetition of facts will naturally result, but of more consequence will be the data relating to the art of Fort Ancient's builders. The ditches will be more reliable on this score than the surface village-sites.

Fort Ancient is a wonderful place. It is far more impressive than the Serpent Mound and stands foremost among the prehistoric monuments of America. It is well that the State of Ohio has vouchsafed to future generations its preservation.

The amount of labor expended upon Fort Ancient by its builders is an indication of its importance and, perhaps, may aid us in determining the time occupied in building the embankments. Dr. Thomas has begrudged the poor natives less earth than they made actual use of, and other observers have placed the amount of material at an absurdly high figure. Those who have stated the amount in figures have spent little time at the Fort in study, and it is quite natural that certain significant facts should escape their eyes.

Much of the earth from the embankments washed into the moats — earth naturally seeking the lowest level. And where moats did not occur, the inside of the Fort being lower, rains swept the earth down upon the general level. In estimating the amount of earth used, the depth of the ditches must be added to the height of the fort walls.

No one has appreciated the amount of stone made use of by the builders, for fully one-third of Fort Ancient is stone. This stone could not have all come from the space enclosed, or from the ravines adjacent. Much of it must have been carried from the Little Miami River half a mile distant, and up a long, steep slope.

I wish to assert that a study of the stone in and about Fort Ancient reveals to one that there was almost as much labor expended in digging it out and carrying it up to the enclosure above as in moving the immense number of baskets of earth comprising the main walls. Indians did not quarry stone in the sense that we do, but they certainly understood breaking it after a primitive fashion. As they found many of the slabs too large to be carried, they broke them. Rude stone hammers and levers were necessary to detach projecting and more or less loose stones in the clay banks — for in the ravine beds they could not find sufficient material. In addition to the stone, glacial clay — which must have been quite difficult for the natives to dig up, considering their lack of tools — was also used extensively. The terraces required much excavating. All this labor required the presence of one or two thousand natives (at least) for a generation.

NOTES ON SURVEY OF FORT ANCIENT.

In order to render unnecessary a re-survey of Fort Ancient, the author inserts the plates of the original survey notes, as compiled from Mr. Cowen's data and Transit Book.

The initial point is on top of the first embankment of the eastern wall, on the south side of the Lebanon and Chillicothe turnpike; the angles being turned off to the right.

Stations.	Bearing.	Dist.	
0 to 1	S 9.30 E	78.6	End[*] of first wall.
2	S 5.20 E	41	Center of first opening, or "gateway."
3	R 12.08	37	Top of second wall. The bearings to Sta. 2 were taken with the needle; the succeeding ones were read by means of a vernier.
4	R 25.51	116.6	End of second wall.
5	R 27.08	32.5	Center of second opening.
4 to 6	R 43.05	31	Top of third wall.
7	R 45.25	156.5	End of third wall.
8	R 44.25	36	Center of third opening.
9	R 44.10	26	Top of fourth wall.
10	R 37.00	101.5	End of fourth wall.
10 to 11	R 21.08	31.8	Center of fourth opening.
12	R 21.08	18.6	Top of fifth wall.
13	R 18.05	67	On fifth wall.
14	R 13.20	44.8	On fifth wall.
14 to 15	R 4.00	38	On fifth wall.
16	R 27.10	62	On fifth wall; outcurve.
16 to 17	R 33.15	33	On fifth wall.
17 to 18	R 31.19	24	End of fifth wall.
19	R 35.48	26.6	Center of fifth opening.
20	R 51.30	22.6	Top of sixth wall.
21	R 63.35	37.4	End of sixth wall, at edge of ravine.
22	R 68.00	33	Bottom of ravine.
23	L 26.10	23	Top of seventh wall.
24	R 14.08	38	On seventh wall.
24 to 25	L 26.10	85.6	On seventh wall.
26	L 16.00	21	On seventh wall.
27	L 5.36	20.7	End of seventh wall.
28	R 2.40	16.6	Center of seventh opening.
29	R 9.00	15.8	Top of eighth wall, and beginning of regular curve.

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[*] "End" of wall, means the end of the top portion farthest from the transit; while "top" means that nearest the transit.

The measurements, unless otherwise specified, are always from the next preceding station.

STATIONS.		BEARING.	DIST.	
29 to	30	R 27.35	52	On eighth wall.
	31	R 34.20	31.6	On eighth wall.
	32	R 42.50	34.4	On eighth wall.
	33	R 49.30	31.8	End of eighth wall.
			+17	Center of eighth opening.
	34	R 68.40	31	Top of ninth wall.
	35	R 78.20	55.6	End of ninth wall.
	36	R 85.10	29	Middle of ravine.
	37	R 82.30	46	Top of tenth wall.
37 to	38	R 25.03	53	On tenth wall; beginning of curve.
	39	R 21.00	85.3	On tenth wall.
39 to	40	R 75.35	45.8	On tenth wall.
	41	R 86.15	57.5	End of tenth wall.
	42	R 93.35	16.5	Center of tenth opening.
	43	R 98.20	14.5	Top of eleventh wall.
	44	R 118.00	38	On eleventh wall.
	45	R 138.50	72.8	Top of deep ravine.
45 to	46	R 111.00	78	Bottom of deep ravine.
	47	R 97.30	102	Top of twelfth wall. On both sides of this ravine [from 45 and 47 to 46], the wall extends down the slope to the bottom, in a straight line, as if it had at one time been continuous across.
47 to	48	R 11.50	153	End of twelfth wall.
	49	R 15 50	15	Center of twelfth opening.
	50	R 20.15	16.5	Top of thirteenth wall.
	51	R 35.15	52.2	On thirteenth wall.
	52	R 39.15	20.9	On thirteenth wall; incurve.
	53	R 31.15	23.8	On thirteenth wall; incurve.
53 to	54	L 6.50	45.1	End of thirteenth wall.
	55	R 5.30	17	Center of thirteenth opening.
	56	R 28.20	15.3	Top of fourteenth wall.
	57	R 60.38	57.7	On fourteenth wall; outcurve.
	58	R 57.15	37.2	On fourteenth wall; outcurve.
	59	R 46.40	48	End of fourteenth wall; outcurve.
	60	R 48.00	15.6	Center of fourteenth opening.
	61	R 51.45	16.6	Top of fifteenth wall.
	62	R 68 15	67	On fifteenth wall.
	63	R 75.00	41.9	On fifteenth wall; incurve.
	64	R 74.00	21.1	On fifteenth wall; incurve.
	65	R 69.30	29.8	On fifteenth wall; incurve.
	66	R 54.45	96	End of fifteenth wall.
66 to	67	R 68 00	16.2	Center of fifteenth opening.
	68	R 78.50	15.5	Top of sixteenth wall.
	69	R 101.40	31.9	On sixteenth wall.
	70	R 102.00	19.3	On sixteenth wall; incurve.
	71	R 93.05	24.9	On sixteenth wall; incurve.
	72	R 79.33	34.3	On sixteenth wall; incurve.
	73	R 57.15	78.6	On sixteenth wall; incurve.
	74	R 47.45	36	On sixteenth wall; incurve
	75	R 38.15	45	On sixteenth wall; incurve.
	76	R 33.42	22	End of sixteenth wall, at top of ravine.
76 to	77	R 23.21	96	Top of seventeenth wall, on opposite side of ravine, at top of slope.
	78	R 15.35	50.3	On seventeenth wall.

STATIONS.	BEARING.		DIST.	
76 to 79	R	19.20	68.4	End of seventeenth wall, on top; outcurve.
80	R	23.04	22.6	End of seventeenth wall, at bottom.
81	R	37.48	64.1*	First end of eighteenth wall, at inside part.
82	R	32.05	25.6	First end of eighteenth wall, at inside part, on top.
83	R	28.25	20.8	Second end of eighteenth wall, on top, on regular line of wall.
83 to 80x			24.3	Measured back in a direct line toward Sta. 80, and distant from that station 33.5† feet. From Sta. 80 to Sta. 80x, is the seventeenth opening. Stas. 81 and 82 are at the end (on bottom and top, respectively) of a spur, which goes in toward center of fort from Sta. 83.
84	R	2.50	64.1	End of eighteenth wall.
85	R	19.25	26.8	Center of eighteenth opening.
86	R	26.25	14.5	Top of nineteenth wall.
87	R	42.25	56	End of nineteenth wall, on top, at edge of ravine.
88	R	51.05	20	End of nineteenth wall, at opening 19, bottom of ravine.
89	R	51.07	24	Top of twentieth wall, on opposite side of ravine, the wall running up on the slope from the bottom.
90	R	47.30	39	On twentieth wall.
91	R	50.30	97.1	End of twentieth wall, on top.
92	R	53.45	33.4	Center of twentieth opening.
93	R	53.15	23.2	Top of twenty-first wall.
94	R	49.20	40.7	End of twenty-first wall.
			+17	Center of twenty-first opening.
94 to 95	R	6.00	34.2	Top of twenty-second wall.
96	R	4.20	37.8	On twenty-second wall.
97	R	20 15	56.3	On twenty-second wall; outcurve.
98	R	31.25	54.1	On twenty-second wall; outcurve.
99	R	34.45	54.8	End of twenty-second wall, on top.
100	R	35.35	18	End of twenty-second wall, at bottom; also, end of the east wall of the "new" or northern portion of the fort.
100 to 101	R	46.45	103	To bottom of so-called "mound;" the initial point of the east wall of the "old" or southern portion of the fort. Only the natural surface exists from Sta. 100 to Sta. 101, there being no indication of artificial deposits. This is not a "mound" at all, but only a heavier wall than those near it.
102	R	33.10	35.5	Top of twenty-third wall ["mound"].
103	R	30.15	18.5	Highest point of twenty-third wall.
103 to 104	L	24.00	48.3	End, on top, of twenty-third wall; incurve.

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* This measure to be used only as a check in drafting, and not to be added in obtaining length of fort wall.

† This measure to be added.

STATIONS.	BEARING.	DIST.	
105	L 37.05	15.4	Center of twenty-third opening.
106	L 50.45	18	Top of twenty-fourth wall.
107	L 89.15	48.8	On twenty-fourth wall.
108	L 96.06	36.5	End of twenty-fourth wall; outcurve.
109	L 95.30	18.2	Center of twenty-fourth opening.
110	L 98.40	51.4	Top of twenty-fifth wall.
111	L 100.40	35.9	On twenty-fifth wall.
111 to 112	L 85.20	77.9	On twenty-fifth wall.
113	L 75.25	94.2	On twenty-fifth wall.
114	L 69.32	45	On twenty-fifth wall; outcurve.
114 to 115	L 30.45	107.6	End of twenty-fifth wall.
116	L 26.50	17.7	Center of twenty-fifth opening.
117	L 25.24	15.9	Top of twenty-sixth wall.
118	L 19.30	45	On twenty-sixth wall.
119	L 11.40	63.7	End of twenty-sixth wall, at ravine.
120	L 8.00	25.1	End of twenty-seventh wall, at ravine, on opposite side.
121	R 2.00	65.7	On twenty-seventh wall.
121 to 122	R 59.55	49	On twenty-seventh wall; outcurve.
123	R 75.45	58	On twenty-seventh wall.
123 to 124	R 88.15	39.1	On twenty-seventh wall; incurve.
125	R 75.45	29.3	On twenty-seventh wall; incurve.
126	R 56.40	28.8	On twenty-seventh wall; incurve.
127	R 19.55	90.5	End of twenty-seventh wall, at edge of ravine.
128	R 14.30	37	Top of twenty-eighth wall, at opposite edge of ravine.
126 to 129		41	End of twenty-eighth wall. The bearing could not be obtained, but Sta. 129 is on a line between Stas. 128 and 130.
130	L 4.45	15.2	Center of twenty-eighth opening.
131	R 1.40	19.5	Top of twenty-ninth wall.
132	R 23.20	65.4	On twenty-ninth wall.
133	R 38.35	43.4	On twenty-ninth wall; incurve.
134	R 49.15	33	On twenty-ninth wall.
135	R 52.25	43.2	On twenty-ninth wall; incurve.
136	R 64.48	45.9	On twenty-ninth wall.
137	R 66.45	32.8	On twenty-ninth wall; incurve.
138	R 62.00	38.3	End of twenty-ninth wall.
139	R 60.50	18	Center of twenty-ninth opening.
140	R 62.30	15.8	Top of thirtieth wall.
141	R 65.30	27.8	On thirtieth wall.
142	R 65.40	29.4	On thirtieth wall; incurve.
143	R 61.55	38.2	On thirtieth wall; incurve.
143 to 144	R 41.30	41.9	On thirtieth wall; incurve.
145	R 9.45	54.4	On thirtieth wall; incurve.
146	L 10.40	60.2	On thirtieth wall.
147	L 14.30	31.1	On thirtieth wall.
146 to 148	L 49.30	68.7	On thirtieth wall; incurve.
149	L 35.51	61.8	End of thirtieth wall, on top; outcurve.
150	L 34.45	30	End of thirtieth wall, at bottom.
151	L 15.10	65	Beginning (at bottom) of thirty-first wall, on edge of ravine, opposite Sta. 149.

STATIONS.	BEARING.		DIST.	
152	L	12.40	45.8*	End of spur, on edge of ravine, below Sta. 153.
153	L	10.30	52.8	Top of thirty-first wall, above end at Sta. 151, 13.5 * feet from latter.
154	R	28.15	87	On thirty-first wall.
155	R	48.15	49.8	End of thirty-first wall, on top.
156	R	59.45	48	End of thirty-first wall, at bottom of ravine.
157	R	53.54	49.3	Top of thirty-second wall.
158	R	48.06	29.9	On thirty-second wall.
159	R	40.50	35.5	On thirty-second wall.
160	R	33.50	43.2	On thirty-second wall; outcurve.
160 to 161	R	24.05	54.2	On thirty-second wall; outcurve.
162	R	41.45	43.2	On thirty-second wall; outcurve.
163	R	59.25	53.7	End of thirty-second wall, on top; outcurve.
164	R	61.05	49	End of thirty-second wall, at bottom of ravine.
165	R	49.15	56.5	Top of thirty-third wall.
166	R	43.45	30.2	On thirty-third wall.
166 to 167	L	28.30	33	On thirty-third wall; incurve.
168	L	41.30	29	On thirty-third wall; incurve.
169	L	36.15	33.4	End of thirty-third wall, on top.
169x	L	36.15	49.2	End of thirty-third wall, at bottom.
170	L	27.15	15.2	Center of thirty-third opening.
171	L	16.30	18.5	Top of thirty-fourth wall.
172	R	12.45	49	On thirty-fourth wall.
173	R	52.20	63.4	End of thirty-fourth wall, on top.
174	R	73.22	46	End of thirty-fourth wall, at bottom.
175	R	75.50	44.9	Center of thirty-fourth opening.
176	R	66.30	41.3	Top of thirty-fifth wall.
177	R	52.25	78	On thirty-fifth wall.
177 to 178	L	2.20	76	On thirty-fifth wall.
179	L	11.15	66.5	On thirty-fifth wall; incurve.
180	R	1.35	57.4	On thirty-fifth wall; incurve.
181	R	2.42	20.7	End of thirty-fifth wall.
182	R	2.15	15.4	Center of thirty-fifth opening.
183	R	2.00	17.3	Top of thirty-sixth wall.
184	R	2.15	55	On thirty-sixth wall.
185	R	6.45	43.5	End of thirty-sixth wall.
183 to 186	R	26.00	17.1	Center of thirty-sixth opening, south-east corner of fort.
187	R	50.00	56.7	Top of thirty-seventh wall, south-east corner; the so-called "mound;" outcurve.
188	R	62.38	33.6	Center of thirty-seventh opening; outcurve.
189	R	75.45	34.4	Top of thirty-eighth wall; second "mound."
190	R	92.05	50.4	Bottom of second "mound," which is only a higher portion of thirty-eighth wall, and, like those at entrance, not a "mound" at all.

---

* Check measure, not to be added in.

STATIONS.	BEARING.	DIST.	
190 to 191*	L 29.45	74.3	End of thirty-eighth wall, bottom of ravine.
192	L 40.45	76.7	Top of thirty-ninth wall, top of ravine.
193	L 43.25	58	End of thirty-ninth wall, on top.
194	L 43.15	15.8	Center of thirty-ninth opening.
195	L 44.00	22.1	Top of fortieth wall.
195 to 196	L 32.15	70.5	On fortieth wall; outcurve.
197	L 27.15	70.5	On fortieth wall; outcurve.
198	L 22.30	66.7	On fortieth wall; incurve.
199	L 22.30	52	On fortieth wall; incurve.
200	L 25.25	64.3	End of fortieth wall.
201	L 22.15	20	Center of fortieth opening.
202	L 20.10	22.8	Top of forty-first wall.
203	L 13.40	41.1	On forty-first wall; outcurve.
204	L 8.10	34.6	On forty-first wall; outcurve.
205	L 2.15	35.7	On forty-first wall; incurve.
206	R 2.00	29.3	On forty-first wall; incurve.
207	R 4.05	40	On forty-first wall; incurve.
208	R 4.00	34.4	On forty-first wall.
209	R 5.15	34.8	End of forty-first wall, on top of deep ravine at south side of fort.
209 to 210	L 16.00	91	End of forty-first wall, in bottom of deep ravine.
211	L 34.50	46	Between bottom and top of slope, on forty-second wall.
212	L 36.20	17	Top of forty-second wall, above ravine.
212 to 213	L 97.15	47	On forty-second wall; incurve.
214	L 107.14	32.3	On forty-second wall.
215	L 106.45	42.1	End of forty-second wall; outcurve.
215 to 216	L 59.35	16.2	Center of forty-second opening.
217	L 42.40	19.1	Top of forty-third wall.
218	L 33.00	58.1	On forty-third wall.
218 to 219	L 57.15	48.8	End of forty-third wall, at bottom of ravine; incurve.
220	L 84.30	33.2	Top of forty-fourth wall, above ravine.
221	L 123.45	90.0	On forty-fourth wall.
221 to 222	L 137.15	54.2	On forty-fourth wall.
223	L 129.10	55	End of forty-fourth wall.
224	L 124.15	16.4	Center of forty-fourth opening.
225	L 120.00	11.8	Top of forty-fifth wall.
226	L 95.25	84	End of forty-fifth wall, bottom of ravine.
227	L 84.30	48	Top of forty-sixth wall, top of ravine.
228	L 74.30	61	On forty-sixth wall.
229	L 62.45	77.8	On forty-sixth wall.
230	L 55.30	82.6	End of forty-sixth wall.
231	L 54.00	18.2	Center of forty-sixth opening.
232	L 52.25	26.8	Top of forty-seventh wall.
233	L 47.10	54.4	On forty-seventh wall; outcurve.
234	L 40.45	73	On forty-seventh wall; outcurve.
235	L 30.00	111.8	End of forty-seventh wall, edge of ravine.
235 to 236	R 34.25	58	End of forty-seventh wall, bottom of ravine.
237	R 35.25	28	Top of forty-eighth wall.

---

* The reading of the needle was reversed at this station to avoid large angles.

STATIONS.	BEARING.	DIST.	
238	R 36.30	53	End of forty-eighth wall, on top.
239	R 37.10	40.3	Center of forty-eighth opening.
240	R 38.00	63	Top of forty-ninth wall. There is a gradual slope to this station from Sta 239, and an abrupt one from this to the next [241].
241	R 38.30	18	Center of forty-ninth opening.
242	R 38.25	25.8	Top of fiftieth wall.
242 to 243	R 32.55	149.5	On fiftieth wall.
244	R 35.00	47	On fiftieth wall.
245	R 38.50	64.2	On fiftieth wall.
246	R 42.00	35.3	End of fiftieth wall, on top.
246 to 247	R 62.45	66	End of fiftieth wall, at bottom, at the north-west corner of "old fort," overlooking the Miami valley.
248	R 86.45	17.7	Middle of a shallow depression, over the angle at corner of fort, leading, by a gradual slope, down to the river.
249	R 97.15	15	Top point of fifty-first wall, which unites here with the fiftieth wall, to form the point or angle [Sta. 248].
250	R 150.30	61.2	Middle of depression in fifty-first wall, where it has crossed a ravine near its head. The hole thus left above has filled up with muck.
251	R 163.30	71.5	On fifty-first wall; incurve.
252	R 160.30	94.5	On fifty-first wall.
252 to 253	R 112.15	54.3	End of fifty-first wall.
254	R 107.20	13.8	Center of fifty-first opening.
255	R 94.45	18.7	Top of fifty-second wall.
255 to 256	R 71.15	97.7	On fifty-second wall.
257	R 73.30	21	End of fifty-second wall, on top.
258	R 87.50	48	Center of fifty-second opening; outcurve.
259	R 85.20	21.7	Top of fifty-third wall.
260	R 88.05	45	On fifty-third wall; outcurve.
261	R 95.00	32.5	On fifty-third wall; outcurve.
262	R 104.45	80.7	On fifty-third wall.
263	R 105.30	34.6	On fifty-third wall; sharp incurve.
264	R 71.30	37.9	On fifty-third wall; incurve.
265	R 55.20	48	On fifty-third wall; incurve.
265 to 266	R 30.15	48.8	End of fifty-third wall, on top, incurve
266 to 266x	R 30.15	24.5	End of fifty-third wall, at bottom.
265 to 267	R 37.20	14.6	[Measured from Sta. 266.] Center of fifty-third opening.
268	R 44.40	9.7	Top of fifty-fourth wall.
269	R 61.00	19.3	On fifty-fourth wall.
270	R 106.10	67.2	On fifty-fourth wall; incurve.
271	R 113.10	32.9	On fifty-fourth wall; incurve.
272	R 113.12	45.6	On fifty-fourth wall; incurve.
273	R 110.40	26.1	On fifty-fourth wall; incurve.
274	R 104.20	27	On fifty-fourth wall; incurve.
274 to 275	R 34.00	35.5	On fifty-fourth wall; outcurve.
276	R 69.45	38.2	On fifty-fourth wall; outcurve.
277	R 81.45	45.3	End of fifty-fourth wall; incurve.
278	R 82.30	18.9	Center of fifty-fourth opening.

STATIONS.	BEARING.	DIST.	
279	R 88.00	14.2	Top of fifty-fifth wall.
280	R 83.35	50.4	On fifty-fifth wall; incurve.
281	R 77.55	47.6	On fifty-fifth wall; incurve.
282	R 69.50	44.7	On fifty-fifth wall; incurve.
282 to 283	R 6.10	117.7	End of fifty-fifth wall.
284	R 10.45	17	Center of fifty-fifth opening.
285	R 20.30	30	Top of fifty-sixth wall. This is what is usually given as a "mound," at the west of the entrance to "old fort."
286	R 34.30	48.8	End of wall fifty-six, on top, next to road at entrance.
286 to 287	R 102.45	28*	Center of fifty-sixth opening, the entrance to old fort.
288	R 63.30	20.8	Bottom of fifty-sixth wall.
102	R 98.30	54.2*	[Measured from Sta. 286.] On twenty-third wall.
289	R 8.45	65.6	[Measured from Sta. 288.] Top of ravine between fifty-sixth wall, the last of the old fort, and fifty-seventh wall, the first (on the west) of the new fort (going from the south). There is no indication of artificial work between fifty-sixth wall and the ravine. [Measured from Sta. 286, it is 34.9 feet to bottom of wall; thence, in same line, 44.2 feet to Sta. 289.]
290	R 8.45	99.4	Beginning of fifty-seventh wall, on opposite side of ravine. The wall has caved back to some extent from the washing out of the ravine.
291	R 12.25	40	On fifty-seventh wall.
290 to 99	R 122.00	123*	Across isthmus, to last wall of new fort, on the east.
291 to 292	R 31.45	78.4	On fifty-seventh wall.
293	R 26.00	57.6	On fifty-seventh wall; slight incurve.
294	R 20.10	34.6	On fifty-seventh wall; incurve.
295	R 11.45	26.6	On fifty-seventh wall; sharp incurve.
296	R 3.15	26.2	On fifty-seventh wall; slight outcurve.
297	L 8.05	37.1	On fifty-seventh wall; slight outcurve.
298	L 19.15	50	On fifty-seventh wall; incurve.
298 to 299	L 55.30	24	Highest point on fifty-seventh wall, overlooking valley; very sharp turn in wall.
300	L 31.45	14.7	End of fifty-seventh wall.
301	L 3.00	20.7	Center of fifty-seventh opening.
302	R 14.10	17.9	Top of fifty-eighth wall.
303	R 38.15	56.5	On fifty-eighth wall.
304	R 46.00	56.9	On fifty-eighth wall; incurve.
305	R 46.15	63.9	On fifty-eighth wall; incurve.
306	R 47.15	159.8	On fifty-eighth wall.
307	R 46.45	31.6	On fifty-eighth wall, at middle of a depression where wall has been built across head of a ravine, which has filled in level above.

* Check measure, not to be added in.

Stations.	Bearing.	Dist.	
308	R 46.10	71.7	End of fifty-eighth wall.
309	R 47.29	25.1	Center of fifty-eighth opening.
310	R 47.45	16.8	Top of fifty-ninth wall.
311	R 48.10	48.7	On fifty-ninth wall; incurve.
311 to 312	R 26.25	91.7	On fifty-ninth wall; incurve.
313	R 33.15	57.6	On fifty ninth wall; incurve.
314	R 35.25	36.8	On fifty-ninth wall; incurve, and middle of depression.
315	R 32.00	54.4	End of fifty-ninth wall, incurve.
316	R 31 00	15.1	Center of fifty-ninth opening.
317	R 30.50	21.9	Top of sixtieth wall; outcurve.
318	R 33.45	42.7	On sixtieth wall.
319	R 36.30	104.2	On sixtieth wall.
320	R 36.00	49.5	On sixtieth wall; incurve above ravine.
320 to 321	L 5.00	50	End of sixtieth wall, at bottom of ravine; sharp incurve.
322	L 15.15	43	Top of sixty-first wall, above ravine.
323	L 18.45	50 5	End of sixty-first wall.
324	L 18.45	12	Center of sixty-first opening.
325	L 18.20	17.3	Top of sixty-second wall.
326	L 14.15	44.8	On sixty-second wall· outcurve.
327	L 12.00	59	End of sixty-second wall.
328	L 9.45	16.7	Center of sixty-second opening.
329	L 7.45	16	Top of sixty-third wall.
330	L 5.10	20.4	End of sixty-third wall, at top of ravine.
330 to 331	R 12.45	50	End of sixty-third wall, on slope of ravine. Wall seems to have been built across the ravine, and been washed out, the wall on opposite side deflecting the water against this wall. The slope is very steep on both sides.
332	R 3.00	34	Bottom of ravine; beginning of sixty-fourth wall.
333	0	74	Top of sixty-fourth wall, at top of ravine.
334	L 7.50	24.2	On sixty-fourth wall; sharp incurve.
335	L 24.15	47.5	On sixty-fourth wall.
336	L 40.00	59.8	End of sixty-fourth wall; outcurve.
337	L 41.10	16.2	Center of sixty-fourth opening.
338	L 40.15	16.4	Top of sixty-fifth wall.
338 to 339	0	81.4	End of sixty-fifth wall, at bottom of ravine.
340	L 21.15	43.8	Top of sixty-sixth wall, top of ravine; incurve.
341	L 35.00	40	End of sixty-sixth wall; incurve.
342	L 35.10	10.4	Center of sixty-sixth opening.
342x	L 51.45	37.9	Bottom of sixty-sixth and sixty-seventh walls, which run out nearly parallel at their ends, with a slight depression as an opening, and unite in a rounded wall at the bottom.
343	L 34.05	15 2	[Measured from Sta. 342.] Top of sixty-seventh wall.

STATIONS.	BEARING.	DIST.	
344	L 12.35	71.9	End of sixty-seventh wall.
345	L 8.35	20	Center of sixty-seventh opening.
346	L 6.00	24	Top of sixth-eighth wall.
347	L 0.20	51.5	On sixty-eighth wall, slight outcurve.
347 to 348	R 27.30	62.5	End of sixty-eighth wall.
349	R 29.50	19	Center of sixty-eighth opening.
350	R 31.30	31.2	Top of sixty-ninth wall.
350 to 351	R 46.15	62.8	End of sixty-ninth wall, at top of deep ravine.
351 to 352	R 22.40	53	End of sixty-ninth wall, on slope of deep ravine.
353	R 13.45	90	Beginning of seventieth wall, on slope of deep ravine.
353 to 354	R 35.35	44.8	On seventieth wall, on slope of deep ravine; incurve.
355	R 8.30	64	On seventieth wall, at top of deep ravine; sharp incurve, making almost a right angle.
355 to 356	L 71.45	107.6	On seventieth wall; slight outcurve.
357	L 78.15	115	End of seventieth wall; slight outcurve; edge of ravine.
358	L 69.25	56.8	Top of seventy-first wall, on edge of washout.
359	L 53.00	74	End of seventy-first wall.
360	L 49.05	19	Center of seventy-first opening.
361	L 44.10	23.5	Top of seventy-second wall.
362	L 35.50	49.5	On seventy-second wall.
363	L 26.25	85.6	End of seventy-second wall, above pike.
364	L 21.20	51.8	Top of seventy-third wall, above pike, on north side.
365	L 21.30	35.7	On seventy-third wall; sharp outcurve.
365 to 366	R 20.35	41.7	End of seventy-third wall; sharp outcurve.
367	R 29.45	27.5	Center of seventy-third opening; sharp outcurve.
368	R 41.45	22	Top of seventy-fourth wall; sharp outcurve.
338 to *	R 3.45	113.5*	Back sight to a point at the bottom of inside slope of seventy-third wall, where pike has cut off the end.
369	R 114.35	53.4	On seventy fourth wall.
370	R 113.00	68.2	On seventy-fourth wall.
371	R 115.30	56.7	End of seventy-fourth wall; incurve.
371 to 372	R 78.25	41	Middle of seventy-fourth opening [ravine].
373	R 67.40	43	Top of seventy-fifth wall.
374	R 68.30	8.9	Center of seventy-fifth opening.
375	R 72.15	21.7	Top of seventy-sixth wall.
376	R 76.25	83.9	On seventy-sixth wall.
376 to 377	R 88.15	28.2	End of seventy-sixth wall, top of ravine.
378	R 90.15	37	End of seventy-sixth wall, slope of ravine.
379	R 86.45	31	Top of seventy-seventh wall, slope of ravine.

---

* Check measure, not to be added in.

STATIONS.	BEARING.	DIST.	
380	R 84.50	43.8	Top of seventy-seventh wall, top of ravine; outcurve.
380 to 381	R 79.45	206	End of seventy-seventh wall.
381 to 382	R 80.05	18	Center of seventy-seventh opening.
383	R 75.35	23.8	Top of seventy-eighth wall.
384	R 80.15	132.2	On seventy-eighth wall.
384 to 385	R 85.50	70.3	End of seventy-eighth wall; outcurve.
386	R 87.15	15.4	Center of seventy-eighth opening.
387	R 84.05	22	Top of seventy-ninth wall.
388	R 81.30	61	On seventy-ninth wall; slight outcurve.
389	R 81.30	160.5	End of seventy-ninth wall; outcurve.
389 to 390	R 90.15	18.4	Center of seventy-ninth opening.
391	R 93.05	21.4	Top of eightieth wall.
392	R 98.45	61.2	On eightieth wall.
393	R 99.00	142	End of eightieth wall.
394	R 99.05	22.6	Center of eightieth opening.
395	R 99.00	37.8	Top of eighty-first wall.
395 to 396	R 98.00	80.8	End of eighty-first wall.
396 to 397	R 93 35	28	Center of eighty-first opening.
398	R 94.15	28	Top of eighty-second wall.
398 to 399	R 87.55	47.8	On eighty-second wall, outcurve.
399 to 400	R 98.00	25.8	On eighty-second wall, sharp outcurve.
401	R 117.15	30.8	End of eighty-second wall; sharp outcurve.
402	R 130.15	29.9	Center of eighty-second opening.
402 to 403	L 18.05	31	Top of eighty-third wall.
403 to 404	L 15.45	75.7	End of eighty-third wall.
405	L 15.45	27.8	Center of eighty-third opening.
406	L 14.05	28.4	Top of eighty-fourth wall.
406 to 407	L 9.15	93	End of eighty-fourth wall, at pike.
0	L 8.00	65	Point of beginning.

The total length of wall, on top, 18,712.2 feet; equal, in miles, approximately, to 3; $3\frac{1}{2}$; $3\frac{6}{11}$; $3\frac{31}{57}$; $3\frac{99}{182}$; $3\frac{130}{239}$; or precisely $3\frac{359}{660}$.

NOTE.—In stating the number of openings in the fortification, we include the natural washes and breaks.

Of the 84 openings, 9 are natural washouts, and 74 are designed entrances (gateways), or for purposes of defense.

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PHILLIPS ACADEMY, ANDOVER, MASSACHUSETTS

DEPARTMENT OF ARCHAEOLOGY

BULLETIN V

Certain Peculiar Earthworks Near Andover, Massachusetts

By WARREN K. MOOREHEAD, Curator

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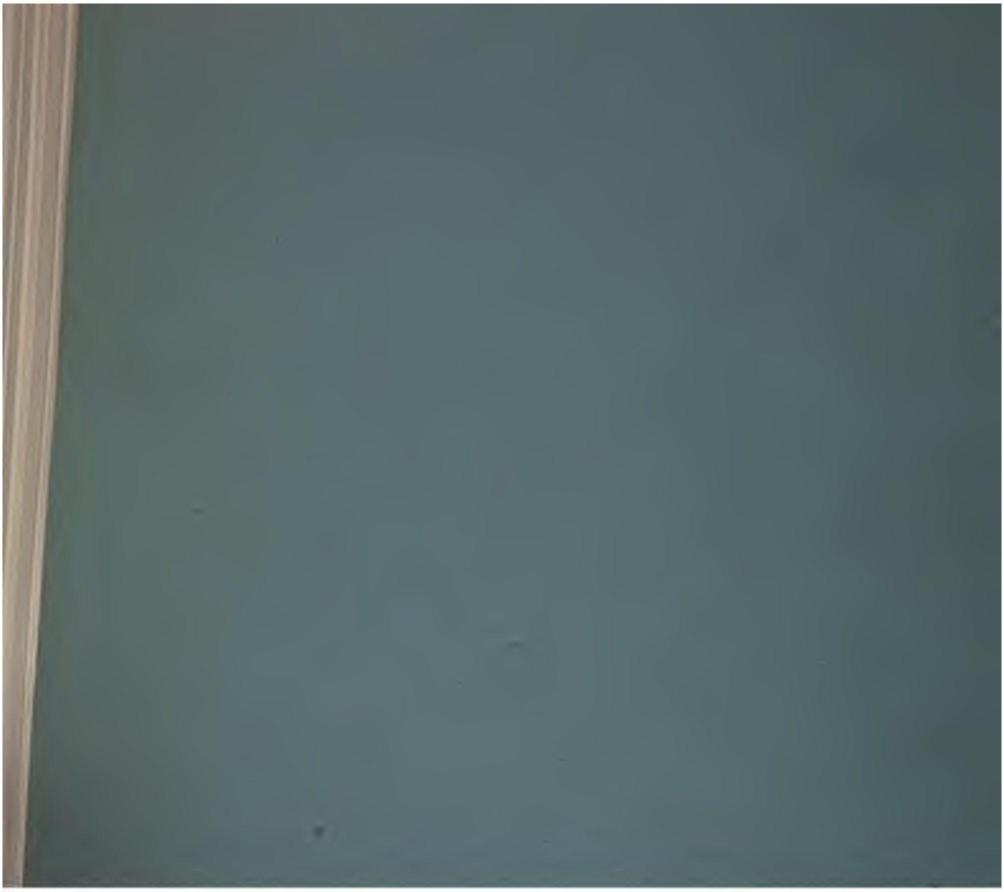

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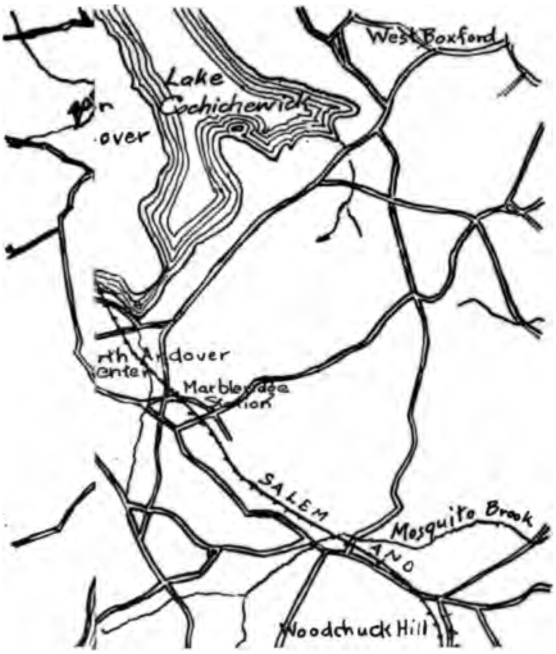
FIG. 1. The Ditch and Wall of Haggett's Pond Work.
" 2. Boy Standing in Ditch — Haggett's Pond Work.
" 3. Wall of Fort Graham, near Station 5.
" 4. The Circular Depression, Fort Graham.
" 5. The Embankment of Fort Graham.
" 6. The Rock Ledge, Flanking Wall of Fort Graham.
" 7. The Embankment at Fort Graham. Station 15.
" 8. Fort Goldsmith. West of Reading Road.
" 9. Fort Goldsmith. East of Reading Road.
" 10. The Foster's Pond Work.
" 11. The Shawsheen River.
" 12. Fort Shawsheen.
" 13. The Wall and Ditch of Fort Shawsheen.
" 14. Mass of Material from Fort Graham.
" 15. Knives and Projectile Points. Fort Graham.
" 16. Chipped Implements. Fort Graham.
" 17. Material in Process of Manufacture. Fort Graham.
" 18. Chipped Object. Fort Graham.
" 19. Sandstone and Trap Objects. Fort Graham.
" 20. Axes Found in Fields near Fort Graham.
" 21. An "Anvil" or Unknown Stone and a Grooved Axe, Found near Pomp's Pond.


West Boxford
Lake Cochichewick
r
over
rth Andover
enter
Marbleridge Station
SALEM
AND
Mosquito Brook
Woodchuck Hill

INTRODUCTION

I desire to thank all those who coöperated in the preparation of this BULLETIN, or permitted us to measure the embankments on their lands.

I am particularly indebted to Mr. James C. Graham of Phillips Academy for discovering several of the places herein described, and for the interest he has manifested in our researches. Professor Allen R. Benner has my thanks for his discovery of the earthwork on the north side of the Shawsheen. Also to Professor Henry Haynes of Boston and Mr. C. C. Willoughby, Assistant Curator of the Peabody Museum, Harvard, I am under obligations. These two gentlemen visited two or three of the earthworks.

The larger part of Fort Graham belongs to Mr. Patrick Larkin of Boston and this land is leased by Mr. Freeman Abbott. Both Messrs. Larkin and Abbott permitted some preliminary excavations, surveying and photographing.

Mr. Percival Dove owns part of Fort Graham and we are also indebted to him and to Mrs. E. H. Stickney, another owner, for permission to carry on investigations.

Not only to all of these persons but also to Mr. William Perkins, the heirs of W. G. Goldsmith, to the Baker estate and Mr. E. R. Fraser we are indebted for permission to examine the works known as Fort Goldsmith and Haggett's Pond.

It was impossible to learn the names of owners of the various small camps along the Shawsheen except Mr. Pierson, Mr. Mr. Edward Poor, Mr. Moses Hill, and Messrs. Hoffman and Burtt. There are several lots the proprietors of which are unknown to us. However we are indebted to all of these people.

The surveying was done by a corps under the direction of Mr. H. H. Smith, C. E., and the photography by Mr. L. D. Sherman.

CERTAIN PECULIAR EARTHWORKS NEAR ANDOVER, MASSACHUSETTS

Shortly after the Department of Archaeology was established at Phillips Academy, Andover, Massachusetts, my attention was called to an embankment and ditch on the edge of Haggett's pond, West Parish, Andover. This is distant about three miles northwest from the town of Andover. Within a short time Mr. W. G. Goldsmith reported a similar embankment on his estate near the Reading road, about two miles south of Andover. Both of these places were examined by me and thought to be Indian, but to make certain I asked that able archaeologist, Mr. C. C. Willoughby of the Peabody Museum of Harvard University to inspect with me these two places. Mr. Willoughby did so.

Something over a year ago Mr. James C. Graham, head of the Scientific Department of our Academy, stated to me that he had found a curious embankment near Foster's Pond, two and one-half miles south-west from Andover. Mr. Graham and I visited this place together on several occasions and I came to the conclusion that the long embankment known as Fort Graham is of Indian origin.

Since the discovery of Fort Graham, we have found four separate works of similar character; two flanking the Shawsheen river just west of Lowell Junction, and extending half a mile up that stream. Another, near the east side of Foster's Pond. This one was also discovered by Mr. Graham. A third lying between the latter earthwork and Fort Goldsmith.

I am indebted to Mr. Graham for the following paragraphs concerning the formation and geology of the earthworks.

"The geology of the region has already been made familiar by the writings of Professor G. Frederick Wright and others on the glacial formations of eastern Massachusetts.* Huge outcrops of coarse granite are interspersed with sandy plains and kames, the latter in many cases being beautifully typical. It is in the sand and gravel of these kames that most of the

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* *The Ice Age in North America.* By George Frederick Wright. 5th Edition, Oberlin, 1911.
Chapter 14, page 339. Kames. Speaks of Indian Ridge.
Chapter 20, page 572. Date of the Glacial Period. Speaks concerning kettle-hole, at Pomp's Pond.
Historical Sketches of Andover, (comprising the present towns of North Andover and Andover) *Massachusetts,* by Sarah Loring Bailey. Boston, 1880.
The Introduction, "*Prehistoric Andover,*" 8 pages, XVII to and including XXIV, was written by Professor G. F. Wright and deals with the geology of Andover.

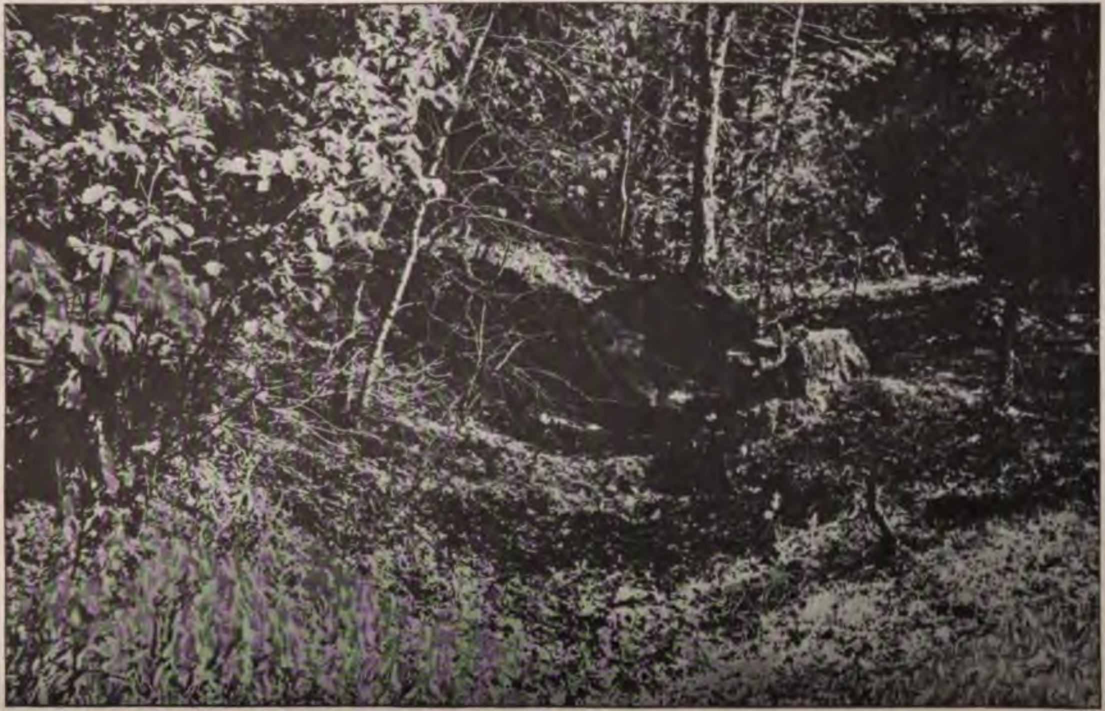


Fig. 1—THE DITCH AND WALL OF HAGGETT'S POND WORK—LOOKING NORTH

trenches have been made, they yielding most easily to the digging implements of the prehistoric Indians. In the case of Fort Goldsmith the fortification runs for some distance along the very top of a steep, sandy kame. The north and south line of Fort Graham runs for the most part through sand and gravel lying at the foot of a granite outcrop, between it and the sandy plain through which the outlet of Foster's Pond flows. At one place on this line the trench does not follow what may be called the front of the hill but leaves a slight elevation between the fort and the plain. Investigation showed this elevation to be due to a mass of granite lying near the surface. Cutting through the granite was impossible for the Indians and hence the line of fortification was brought back to where the surface was more yielding. It is at this point, behind the line, that there occurs one of the circular structures, possibly built to strengthen this weak point in the defence in somewhat the same way that a turret is used to strengthen the vulnerable point of a wall. These circular structures are certainly not of glacial origin as the ridges of sand and gravel around the depressions show plainly that the sand was removed from the center making the depression, and thrown out making the ridge: and in making a section of the ridge it is quite easy to see where the original sod-line was.

" The east and west line of Fort Graham runs entirely through rather fine sand except at its eastern end where it is in lower and swampier ground. The trench along the Shawsheen is partly in the coarser material left by the erosion of the river, though much of it is in the sand."

That seven supposedly Indian works should exist in this long-settled part of New England, and not have been previously described by some one of the many persons who have during the past three centuries been interested in matters pertaining to Indians, is quite surprising. Yet so far as I can ascertain, no reference has been made to these interesting and extensive works. If they have been previously observed, or accounts of them have been published, of course I stand corrected.

There are similar embankments two miles north of the village of Millis, which lies about 25 miles northwest of Boston. These have been known for some time and are to be described by Mr. C. C. Willoughby in the " American Anthropologist."

Of the seven works near Andover, a preliminary examination has been made by our Department. Mr. H. H. Smith, a Civil Engineer, was employed by us to survey all of them carefully and to make maps, which are reproduced in this pamphlet.

There was also considerable excavating carried on by three or four men under our direction at various points in the ditches, the walls, and near the embankments at two or three of the places. While these excavations are not productive of great results, yet they tend to confirm the opinion that the five earthworks were not constructed by early white colonists, but are the works of the Indians. Why the Indians should have constructed these small embankments in such peculiar locations, I leave for others to decide.

The wall at Haggett's Pond would seem to mark the site of a stockade or fortified village for obvious reasons, but the other works do not seem to have been built around villages, for the very good reason that there are no quantities of chips, broken implements, spalls, burnt stone or anything else denoting Indian occupation. At Millis there are numerous chips, spalls, etc. and the Millis works may have protected a village. As to this, I cannot speak until Mr. Willoughby's paper is published.

I walked over the Millis embankments in order to compare them with our seven forts. If they are of Indian origin, the ones near Andover certainly are. There is little difference in height of wall or depth of ditch. Perhaps the total length of walls at Millis exceeds those of Fort Graham, yet the sum of the embankments near Andover surpasses those at Millis. The main wall at Millis is on the side of a hill, the ditch uppermost — exactly as at Forts Shawsheen and Goldsmith.

We may be sufficiently optimistic to believe that a future and thorough exploration of these various places will solve the problem of their construction. Certain it is, that much can be learned after more time is spent in their study.

Our object in publishing a preliminary report is to call attention to these works and to procure, if possible, information of other and similar earthworks to be found in New England. For it appears likely that there are other places of this character in Massachusetts if not throughout New England. I have already heard of a similar work in Maine. Correspondence is desired with any persons who can give us information regarding embankments and trenches of the sort herein described.

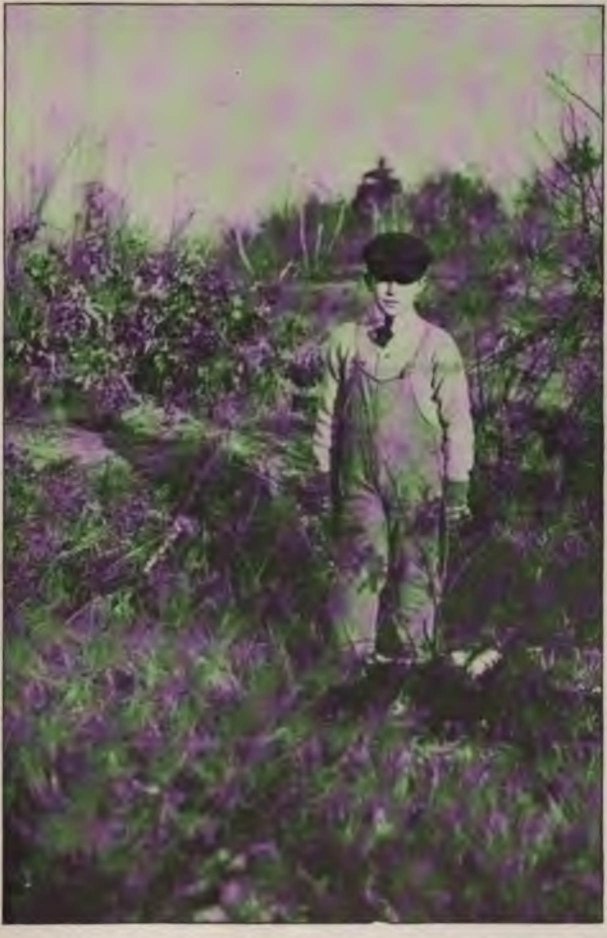
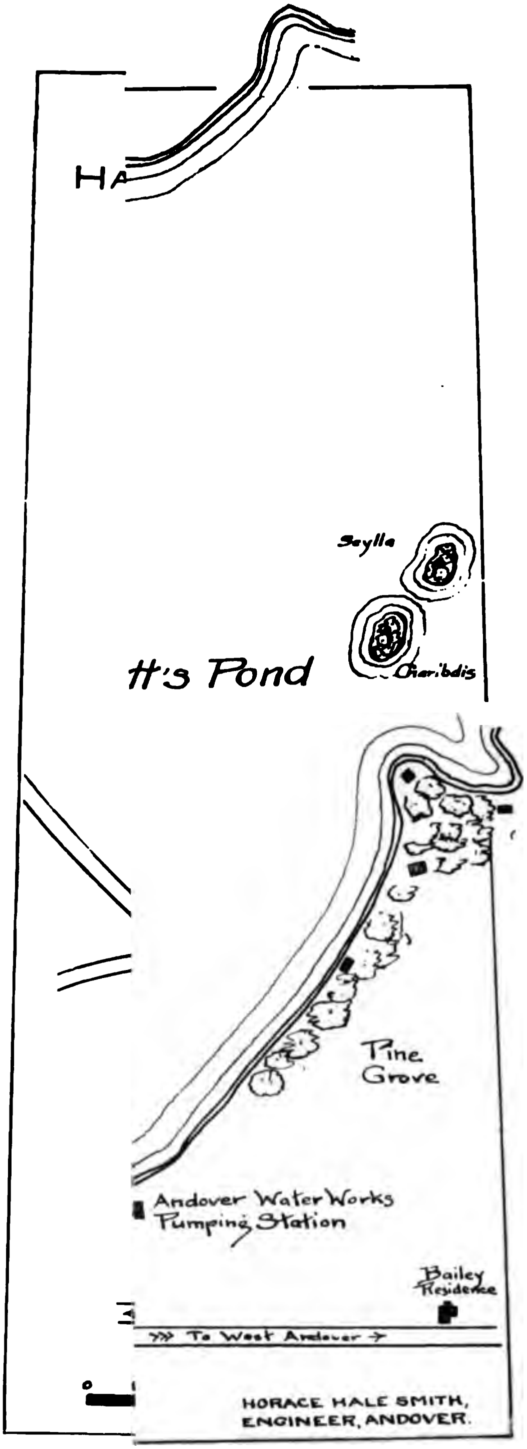


FIG. 2—THE DITCH AND WALL OF HAGGETT'S POND WORK—LOOKING EAST

Boy Standing in Ditch



HORACE HALE SMITH,
ENGINEER, ANDOVER.

THE HAGGETT'S POND EMBANKMENT

This lies on an elevation at the west end of Haggett's Pond and some forty feet above the water and is on the farm of Mr. E. R. Fraser. The terrace on which it is situated is quite flat, although about one quarter of a mile to the west there is a long, prominent hill. The flat plain is composed of sandy soil, and numerous arrow points, burnt stone, chips and spalls have been picked up at various times.

Mr. John Follansbee, living near Haggett's Pond, who for many years collected specimens, accumulated several hundred implements, a large part of which came from this site. At the present day, in spite of extensive "relic hunting" on the part of collectors from Lowell and Lawrence, there are still to be seen numerous chips, flakes and spalls. The embankment can be traced for 300 feet, and at the present time it is something like two feet in elevation at the highest, and one foot at the lowest points.

Mr. Willoughby was of the opinion that it was a part of an Indian stockade. He based his conclusions upon examination of the site.

The ditch is on the side farthest from the pond. From the original bottom of the ditch to the top of the embankment is some three to four feet, although at certain points the ditch is not so deep.

Within the trench, upon the embankment and upon the eastern or pond side, are numerous large, old growth stumps. On the opposite side (west) there are no large stumps, and the growth is manifestly of recent origin. The land a few hundred feet to the west has been long under cultivation. The ends of the trench and embankment are not quite obliterated, and enough remains to indicate that at these points they turned abruptly to the west, and continuing, formed originally the northern and southern boundary of the fort or stockaded village. The engineer, Mr. Smith, traces the wing walls about 150 feet west. Mr. Willoughby concluded that the present embankment is all that remains of an enclosure which surrounded an Indian town, the northern, southern, and western embankments having been ploughed away, and the ditch filled by cultivation. I agree with him. The soil at the point where the embankment still stands must have been poor, and the timber heavy. At any rate, for some reason this portion of the work was not obliterated by recent landowners.

Reference to the map shown in Plan II of surveys by Mr. Smith will acquaint readers with the size of space enclosed by the embankment. We assumed that the embankment extended something like four hundred feet westward and that the fourth or westward wall was perhaps longer than the eastern extension. Towards the west the land is level, but there is a slope towards the pond, (east) some hundreds of feet distant. A deep ravine, the bottom of which is forty feet lower than the fort wall, flanks the north side. There is a stream and swampy land in the bottom of this ravine.

The fact that the ends of this embankment are turned, and that all the rest of the land has been cultivated for generations is significant. It means that the present embankment owes its preservation to the fact that it was in timber. This timber has been cut off within the past few years. The rest of the embankment being in the open and at no time very high, has been ploughed out of existence. From the absence of glass beads or articles of European manufacture, I would venture the opinion that the village was pre-Colonial, and the Indians living there were not acquainted with the white settlers. Some later aborigines may have occupied the site, but there are no surface indications.

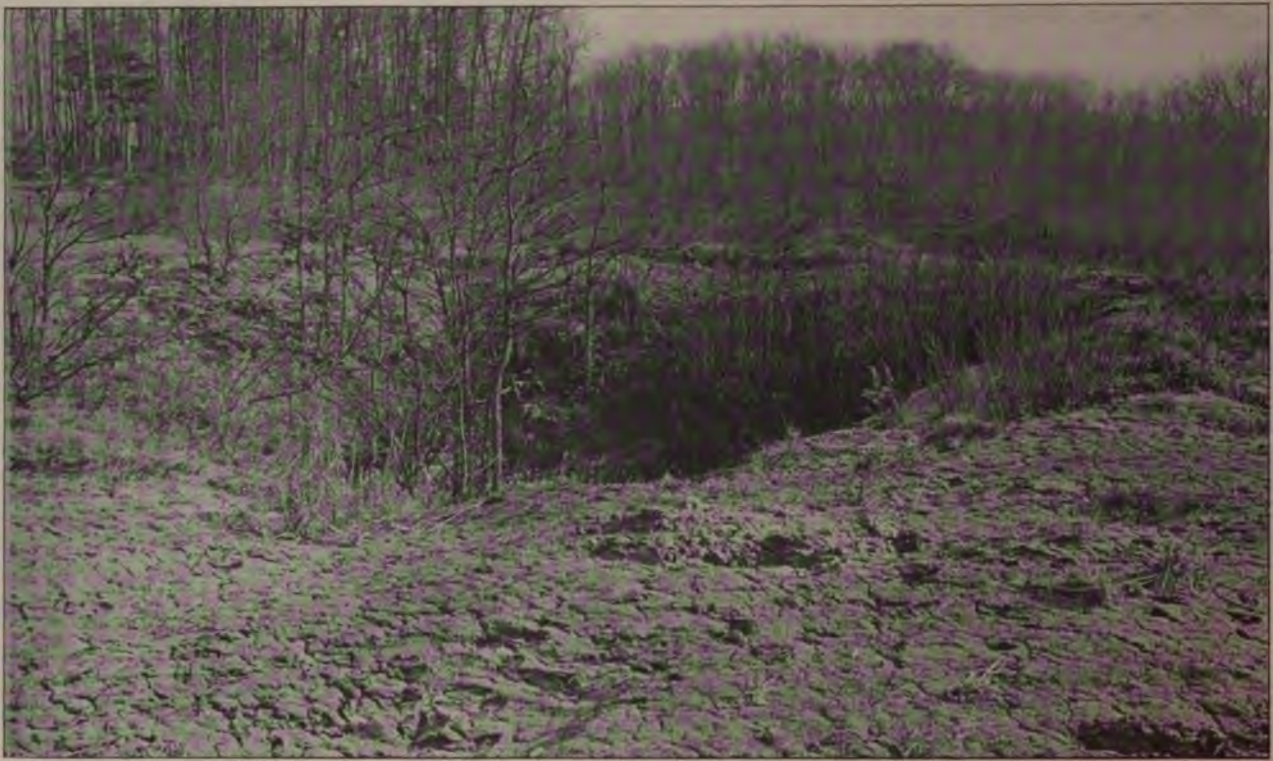


FIG. 4 — THE CIRCULAR DEPRESSION, FORT GRAHAM STATION 4 — LOOKING EAST

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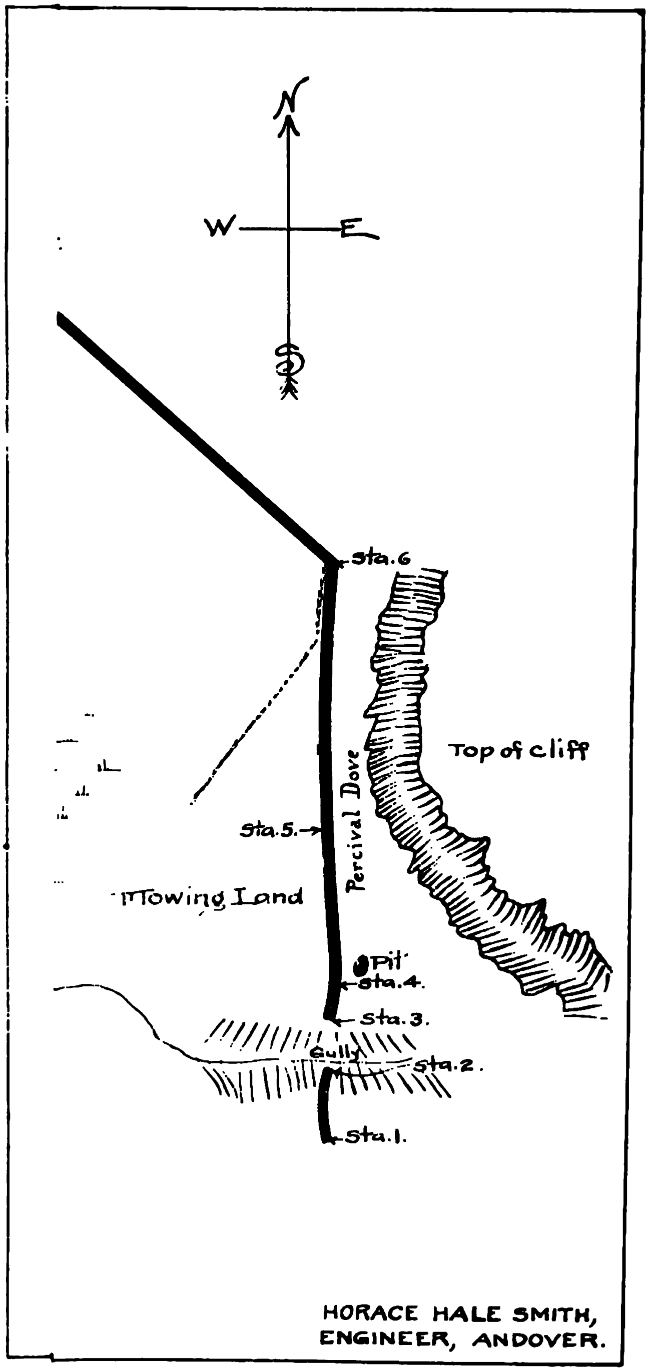

HORACE HALE SMITH,
ENGINEER, ANDOVER.

Part of the embankment toward the north is on the land of Mr. Percival Dove. The southern portion is owned by Mr. Patrick Larkin, and rented by Mr. Freeman Abbott.

Haggett's Pond work is of easy solution, but Fort Graham is not. The total length of embankment at Fort Graham is about 5050 feet. This does not include that section of between 900 and 1,000 feet which we cannot trace at the present time, but suppose once connected the walls. Nor does it include upwards of 600 or 700 feet of embankment which we assume existed because here and there there are traces of it. This refers to the embankment between station 1 on the map and the outlet of Foster's Pond. It is quite evident that the embankment extended in a straight line from station 1 to the brook (pond outlet). At points along this straight line referred to, we sunk pits and found charcoal and ashes in one or two places at a depth of about two feet. The old sod-line of the ditch was observed. All of this proves that cultivation of the field for an unknown length of time resulted in the embankment being ploughed down and the ditch filled. There was no ploughing at station 1 for the reason that the soil is poor and the farmers had no desire to cultivate it. The soil from station 1 to station 5 is chiefly composed of sand.

Reference to the map in Plan III will show that we can trace three sides of Fort Graham. That is, the wall beginning about 900 feet north of the outlet of Foster's Pond (dam) and running north to station 6 on the map, where it turns to the west, and is lost in a swamp (7), begins again further on and continues west until it disappears at the edge of a small pond. It is inconceivable that Fort Graham surrounded a village, for the reason that there is much low, swampy land uninhabitable; also, there is far too great an extent of territory enclosed for a New England village site. There is no evidence, absolutely none, that from the dam or outlet of Foster's Pond the embankment extended west or south-west, joining the other wall at station 15 (see map, Plan III). If the embankment ever did exist between station 1 and station 15, it has

disappeared through cultivation or other agencies. The space enclosed, assuming that the embankment surrounded a village, is at least 2,500 x 3,000 feet, perhaps more. A village occupying such an extent of land would be easily determined because of the great quantity of chips, burnt stone, spalls, etc. occurring on the surface. Furthermore, the available ground for a village site, lying fifteen or twenty feet higher than the low, swampy ground referred to, is something like forty acres. Of this, twenty acres is sandy, dry soil, admirably suited for the location of Indian houses. Several of us accustomed to field searching went over this ground very carefully a dozen times, and all that we found was one arrow head and half a dozen chips of flint. Thinking the village debris may have been covered by accumulation of soil, or shifting sand, I had four men sink upwards of fifty pits at various points on this flat. Nothing was found in any of these excavations indicating a human habitation.

It would seem therefore, that Fort Graham was not a village site, but that the walls were erected and ditch dug for a different purpose. Whether a certain tribe wished to protect itself against the incursions of an enemy, whether the long embankments were part of a game drive, are questions I cannot answer.

A DETAILED EXPLORATION AND STUDY

Station I of the survey was established where the embankment is clearly defined. This we called the south end. Between this point and the outlet of the pond, to the south, here and there the embankment can be traced. Digging reveals that the ditch has been filled up. But as the average person cannot trace the embankment south of station I, we have not placed it on the map. Its destruction between station I and the brook is due to cultivation of the soil by white farmers. Where the embankment begins, an excavation revealed considerable charcoal and burnt earth at a depth of more than two feet. There were also a few chips of argilite and chert at this point. Continuing north, the embankment is about a foot in height, the ditch a depth varying from six to fifteen inches. After some distance, one encounters a ravine at station 2, and here a brook flows westward. The embankment is carried down on the south side of the ravi nearly to the brook. But on the north side (station 3) th embankment cannot be traced until one is about seventy fe beyond the brook. An experimental pit sunk twenty feet sout of the embankment on the north side of the brook, station resulted in an interesting discovery. Apparently three feet soil had washed down from the hill above. A large bowlder wa uncovered at a depth of two and one-half or three feet. the base of this bowlder on one side lay one hundred or mo chips of chert and porphyry. These were within the space a foot and a half, and it was clear that some Indian had s on the edge of this rock and had chipped out implements. The was also some charcoal. Continuing north, following t embankment, at station 4 we observed to the east a circul depression in a sand knoll. This is quite extensive, being som thing like forty feet in diameter and six or more feet in dep when we began its excavation. At first we supposed that men ha opened a pit from which they hauled away sand. But on invest gation we concluded that the pit was due to Indian work. Whe white men dig out sand or gravel, they invariably seek a bank an work in from the side. It would be extremely inconvenient load sand or gravel from a depression of such depth. Furthe more, there are convenient sand and gravel pits nearer the mai road and these have all been worked from the side. After M Graham had examined this circular depression, and another on near by, he concluded that both were of artificial and not glaci origin.

The depression referred to is about thirty feet from the fo wall and the ground about this sink hole, even up to the base o the wall, is filled with chips and spalls of stone from the Wake field quarry, from the Marblehead quarry, and other source of material. We collected upwards of a half bushel of flake etc. and saved of these some hundreds, placing them in th Andover museum. There were also found a number of arro points and knives. The bottom of the depression was cleane out and three feet beneath the present base we came upon pur white sand, and concluded that no Indian work existed at greater depth than a foot or eighteen inches below the surfac at this place. In trenching through from about half way up th

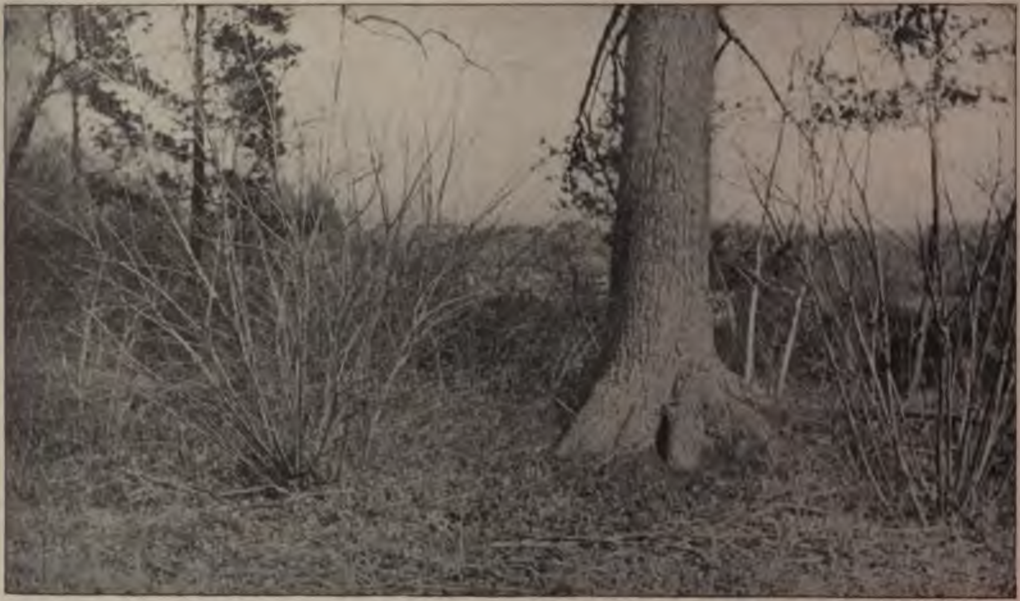

FIG. 7—THE EMBANKMENT AT FORT GRAHAM

Height 20 inches. The Pine Tree is large. Near Station 15.

pit toward the fort wall, one or two arrow points and numerous chips were found at some depth, but these may have rolled down the sides of the excavation when it was steeper, and have been covered up by shifting sand. That so much material should lie about this excavation, and in it, seemed strange. The thought occurred that possibly the natives roofed the pit over and made of it a place of residence. Certainly it would remain warm and dry in all seasons. Such habitations are of course rare in this part of the country and the theory may be incorrect. But it is difficult to account for such evidence of working of stone in this particular depression and hill, when there are other knolls as conveniently situated, and of the same soil.

The embankment continues over the side of the knoll referred to and on down to lower ground. At station 5 we cut through the wall and examined the ditch somewhat thoroughly. We found that the original ditch was fifteen or sixteen inches deeper than at present. Adding this earth to the embankment above, one obtains something like four feet as original height of the top of embankment from the bottom of the ditch. This should be added for the reason that it doubtless washed down from the wall into the trench. To the east, opposite station 5, is a ledge of rock rising to a height of forty feet in places. Mr. Graham suggested that this ledge constituted one of the strong objections to the supposition that a village existed to the west of the fort wall. The rocks command the entire space lying west. It would seem that instead of defending the plain, they sought to protect the hills. At Foster's Pond fort, something under a mile distant, the opposite will be found to be true when we come to study that spot.

That these ditches are along the inside of the works strengthens the theory of the Indian origin. Prehistoric earthworks of the Middle West and South have, in nearly every instance, a ditch on the inside. This is in accord with more recent progress in military science. Ditches within earthworks are observed all through the Mississippi valley. The ditch being toward these rocks and bluffs is an indication that the defenders had their camps east of the wall.

At station 6 the wall turns abruptly toward the northwest and can be followed for several hundred feet to the edge of another brook. There are stumps of large pine trees in evidence on the wall in many places. Beyond this brook (station 7) the wall passes into very swampy ground and is soon lost. Undoubtedly this is due to the settling of the marsh for swamp lands are unstable. Be that as it may, we must leave a gap in our map, for the simple reason that we cannot follow the wall all the way to the Wilmington pike, (station 11). At station 8, in the low ground, the wall is again observed. After continuing for about 200 feet, at station 9, it turns abruptly to the south and can be traced to station 10, about 500 feet. Here it is again lost for nearly 500 feet further.

A short distance ebfore we reached station 11 there are numerous tracts of sand known as sand dunes or sand blows. Not only would nothing grow upon the sand dunes or sand blows, but their cultivation is impossible; nature, not man, here destroyed the wall. Two hundred feet north-east of the pike is station 11 and we can trace the wall to the Wilmington pike which is cut through it at stations 12 and 13. The wall extends south-west, passing down the hill and across a plain into some heavy pine timber. Here it flanks the pond and is very distinct, being nearly two feet high in places, and the ditch upwards of a foot in depth. It ends abruptly on the edge of a pond at station 15.

COMPOSITION OF WALL

The wall is composed entirely of earth, there being no stone in it, although there is little gravel in places. It is apparent that it was constructed a long time ago, for the various colored masses of earth, found in western earthworks, are not apparent. Quite likely, it was taken up in very small quantities for it is homogeneous in character.

WAS IT FOR STOPPING FOREST FIRES ?

This theory has been advanced by one or two correspondents who read my article in the *Boston Transcript.* The matter has been carefully considered by several persons familiar with New England forest conditions of long ago. The wall is too big and the ditch too deep to serve as an ordinary fire break. Moreover, the brook (now a pond) along which the wall extends for some distance, would naturally stop a fire. The Shawsheen fort follows the river for a mile and is at no place more than eighty feet distant from the water. Usually it is twenty to forty feet from the stream. As both fort and ditch are but a few yards in width and the Shawsheen varies from forty feet to upwards of two hundred, no sane person would build a wall with a view of arresting a forest fire when the Shawsheen river would perform that office much more effectively.

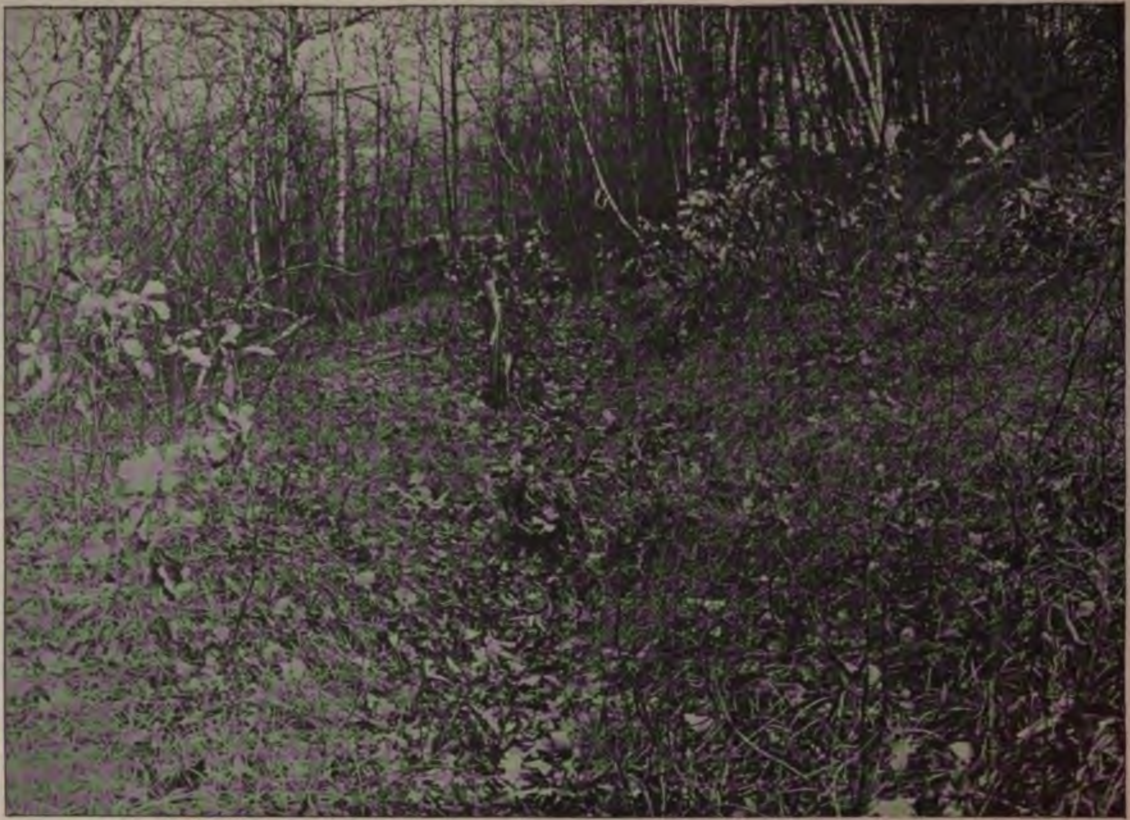

Fig 8 — FORT GOLDSMITH, WEST OF READING ROAD — LOOKING NORTH-EAST

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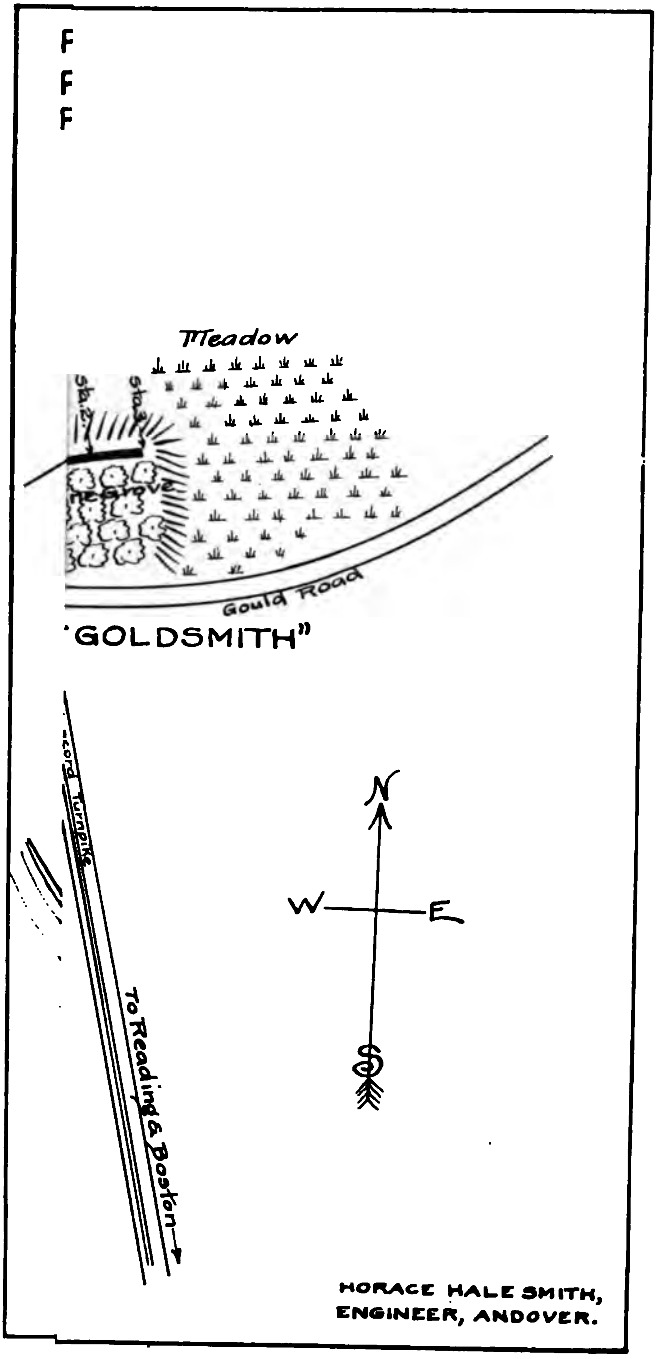
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HORACE HALE SMITH,
ENGINEER, ANDOVER.

FORT GOLDSMITH

On the estate formerly owned by Mr. W. G. Goldsmith and on adjoining lots owned by Mr. Perkins and the Baker estate are two earthworks similar to Fort Graham but not so large. The character of these is clearly shown in Mr. Smith's survey maps numbers IV and V. It will be observed that the extreme end of Fort Goldsmith lies east of the Andover, Reading and Boston turnpike. From the edge of the turnpike to the eastward, the embankment can be traced for 210 feet. The embankment is somewhat different from Fort Graham in that it follows the edge of a ravine, being placed something like 15 to 20 feet down the slope from the plateau above. This slope is rather abrupt, and the bottom of the ditch must be nearly seven feet lower than the plateau above. There is a heavy growth of small pine timber on this lot and the surface is fairly flat. The ravine to the north, is rather precipitous. The embankment instead of following the edge of this ravine, as in case of earthworks in the Ohio valley, has been constructed some little distance down the slope as stated above. The ditch here is on the upper side, which would indicate that if the work is at all defensive, the natives responsible for its building were seeking to defend the plateau referred to. Not far from the eastern end of the embankment is a swamp, and farther along in the same direction a fine spring. When the weather permits, next April, it is our intention to excavate near this spring and at several points on either side of the walls of Fort Goldsmith. Up to the present, no excavating has been attempted here.

To the west of the turnpike and the Bay State Street Railway, the embankment cannot be traced for some 350 feet. This is because a house, chicken yard and small stable are in evidence and as a consequence the embankment is probably obliterated. To the southwest of the house the wall begins again. Reference to the map, Plan IV, will make clear to readers these points. Here it follows the edge of the hill, curving gracefully towards the south-west where it ends abruptly. The hill at this point may be properly called a ridge, and there is a deep depression to the south; not a plateau, as in the case of the eastern

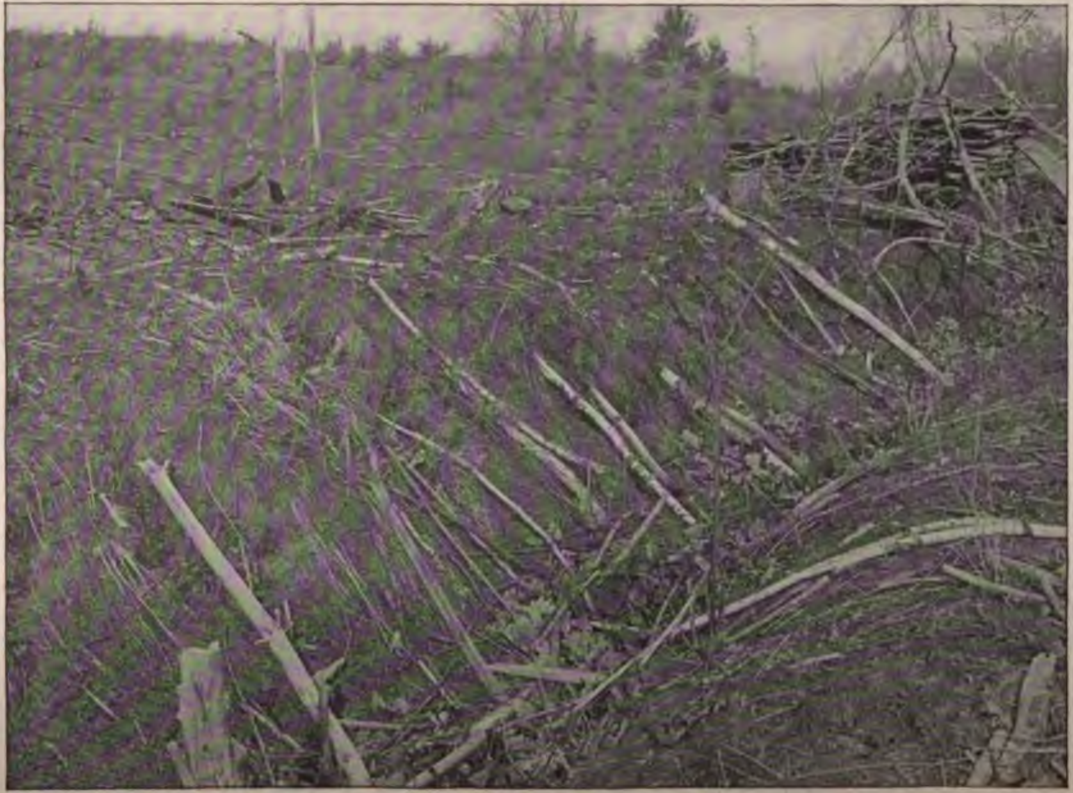


Fig 10 — THE FOSTER'S POND WORK — LOOKING WEST

extension of Fort Goldsmith. The theory at once suggests itself that in the depression was a winter camp of Indians and that the wall was crowned with palisades to protect such a village. As against this theory it is quite proper to record the unusual location of such a village, part being on the plateau and the remainder in a deep depression.

The embankment, composed entirely of earth, varies from eighteen inches to three feet in height. At the point of greatest contrast it is four feet from the bottom of the ditch to the top of the wall, (near station 1), and originally the contrast must have been something like six feet. Fort Goldsmith, east of the turnpike, and Fort Shawsheen present the clearest defined embankments and ditches. The works at Haggett's pond and Fort Graham are not so well preserved.

West of Fort Goldsmith there is another embankment extending along the crown of a gently sloping ridge on or near the Baker estate land and known as Fort Baker. This is not quite so prominent in places as the others, yet can be clearly defined and followed throughout its length of 400 feet. See Plan V.

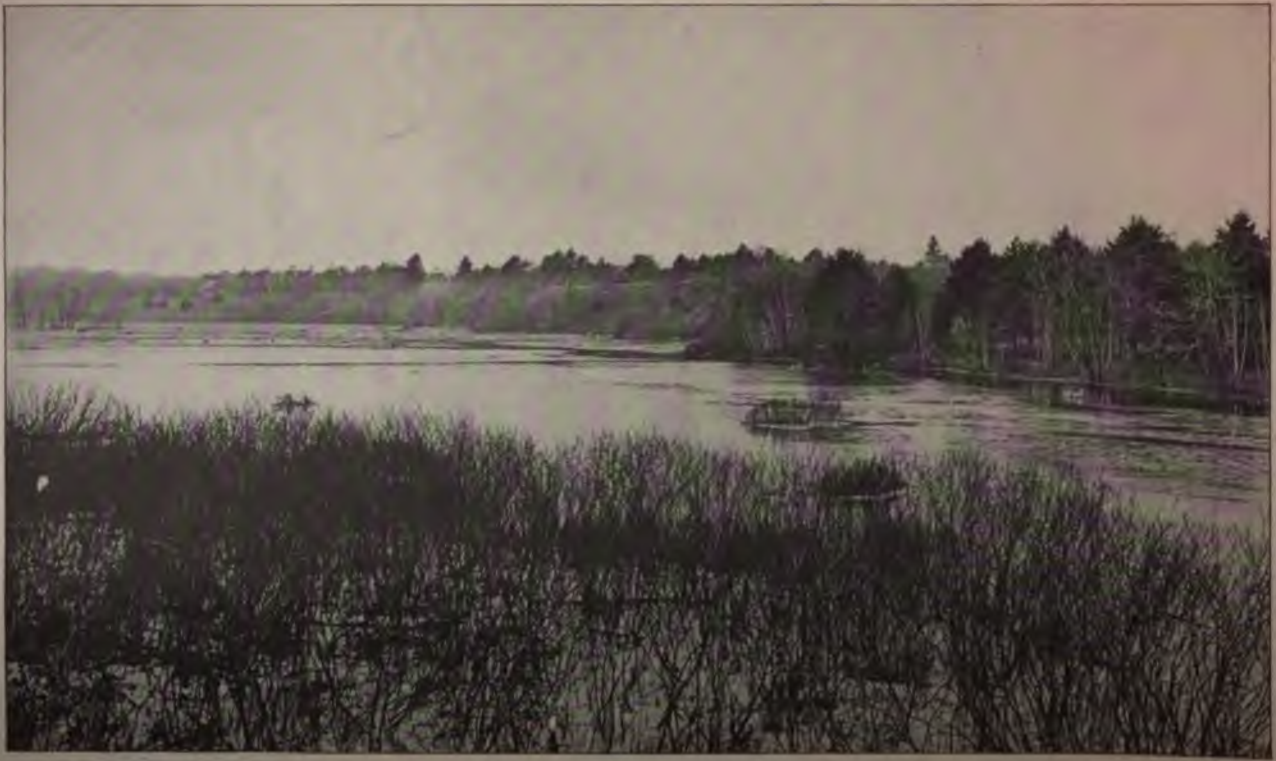
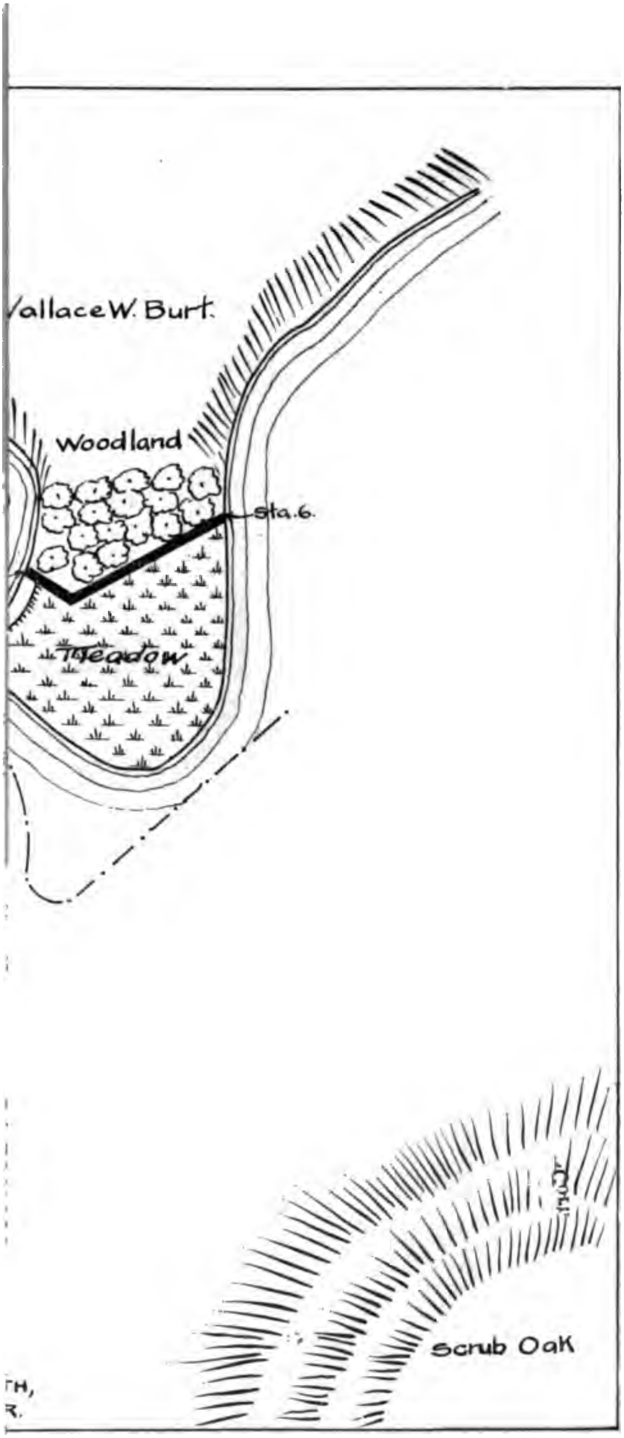


FIG. 11 — THE SHAWSHEEN FROM FORTS BENNER AND SHAWSHEEN — LOOKING UP STREAM



UNIV. OF MICH.

FORT SHAWSHEEN

Here we have a work which is interesting in that it follows the bank of the river, as has been previously stated, for nearly a mile, south or south-west of station 1. It is shown in plan VI. The point at which it begins is not far from a large brick building or factory. The land is owned by various persons who have small camps along the river, which is quite picturesque at this place.

This embankment is splendidly preserved and is clearly traced and easily found, for the wall begins about one-fourth of a mile beyond Lowell Junction station. At station 4 the embankment ends abruptly at the edge of the river. Between stations 4 and 5, a distance of 1600 feet or more, the embankment cannot be traced. Yet one naturally supposes that the embankment did exist at one time between stations 4 and 5. It is possible that there are some embankments on the higher ground back from the river, toward the east, but so far we have not been able to find other embankments.

At station 5 the embankment begins again at the south end of an old dam, on the edge of a swamp, and after extending something like 500 feet, ends abruptly at the edge of a deep eddy in the Shawsheen. As in the case of other embankments, the line is quite straight and there is no evidence at either end that the walls have been turned. Thus it is different from the work at Haggett's Pond which we are sure surrounded a village. Aside from prominence of the wall at Fort Shawsheen the ditch is on the average deeper than in the other works. The ditch is on the side away from the river, thus indicating that natives who occupied the place wished to defend the land to the south, from an enemy coming up or down the river, or approaching from the north, beyond the stream. These arguments apply, of course, if the work is defensive in character.

Fort Shawsheen has not been thoroughly explored, and as was stated in the beginning of this BULLETIN, all of our examinations are preliminary. No excavations have been attempted in the embankments or ditch. But one of our workmen was ordered to spend fifteen or twenty days in searching

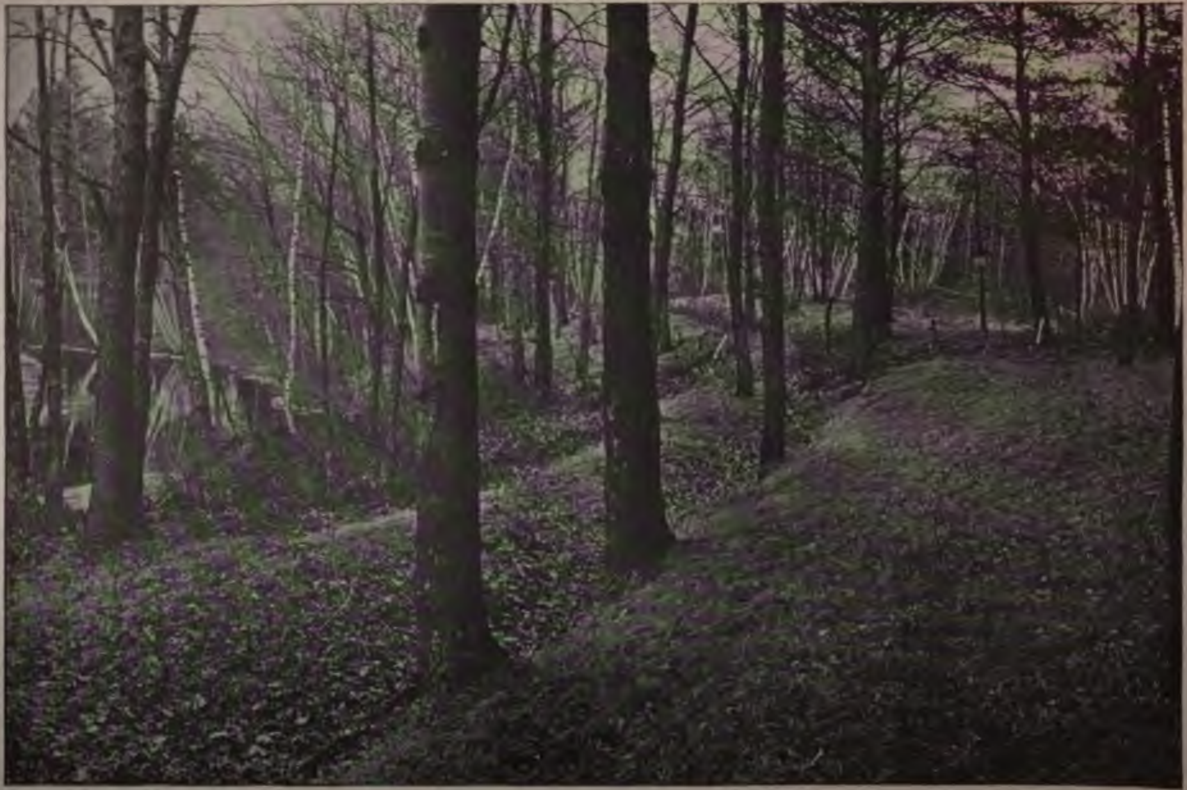


FIG. 12 — FORT SHAWSHEEN — LOOKING NORTH-EAST

Near Pierson's Camp

the surface of fields not only about Fort Shawsheen but near the other enclosures. His work resulted in the finding of great quantities of chips, flakes, etc. such as commonly result from the manufacture of implements. There are attractive knolls along the Shawsheen and on not a few of these, summer camps have been erected by persons who live in nearby towns. It is about these knolls that most of the evidences of chert and argilite chipping occur.

Fort Shawsheen indicates to my mind that these works were not constructed by early white colonists. It is evident that the Shawsheen river would act as an effective barrier in case of forest fires and therefore the embankment would not be erected to arrest such conflagration. In addition to this theory that these walls were constructed to prevent fires from spreading, the more plausible solution has been volunteered that these were erected to mark boundaries of farms in early times. At first we thought that this might be the correct explanation of the works, but Fort Shawsheen and the western extention of Fort Goldsmith are entirely too large to serve for such purpose. Moreover, when the country was first settled, trees were frequently blazed to indicate boundaries, and later not only were stones set up as marks, but stone walls were speedily constructed as the country became settled. The stone walls do not follow these embankments and at Fort Graham, where the embankment at two points forms a boundary between the land of different owners, a stone wall follows it but a short distance. Where walls have existed for a great length of time and have been removed, there is a small elevation or ridge to be observed, but there is no ditch.

Furthermore, while a wall may leave a slight ridge yet it is not to be compared, as to size, with the walls of the places shown in our maps.

Small fields, cultivated for generations here in New England, present an interesting study when compared with the embankments. Particularly noticeable are ridges about the edge of fields where the ploughing has followed the same direction year after year. This tends to move the earth to one side of the field and if the furrows are run the same way each year, it banks up along the edge of a wall. Such a place is Carter's Hill,

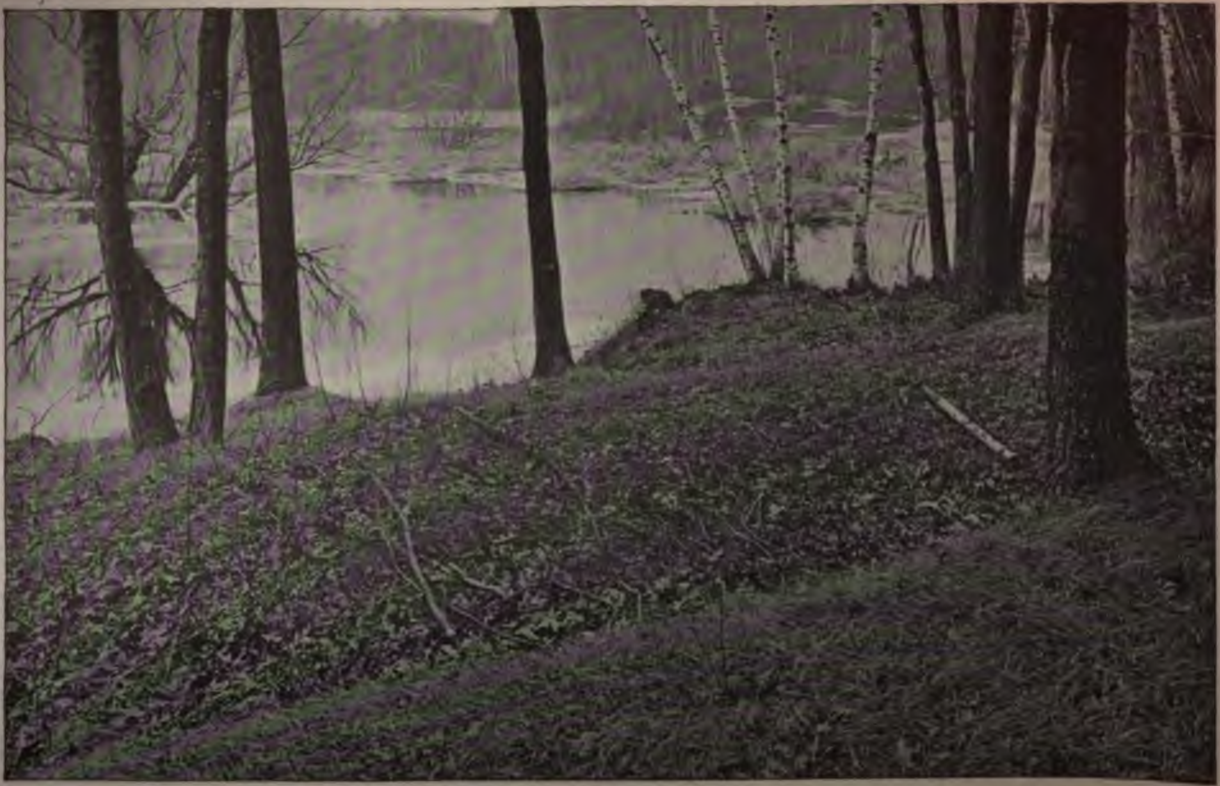


FIG. 13 — THE WALL AND DITCH OF FORT SHAWSHEEN — LOOKING NORTH-WEST

Near Pierson's Camp

the home of the late Mr. Charles L. Carter. Mr. Carter's beautiful estate is on one of the high hills about half a mile east of Phillips Academy. At first we supposed that the embankment on his hill was due to Indian occupation. But Mr. Willoughby was inclined to the opinion that the small wall of earth surrounding several acres, is the result of continuous cultivation, the furrows being turned the same way. I am willing to accept his conclusion. It is just possible that the earthwork on Carter's hill is Indian, but the evidence would tend to indicate that it is not, and the walls are very small as compared with the others. We dug a number of pits on Mr. Carter's place, but found nothing — no flint chips, no charcoal.

The forts Shawsheen and Goldsmith, and portions of Fort Graham are where cultivation would be improbable if not impossible. Therefore, these are not to be placed in the same category with the embankment on Carter's Hill. At Fort Goldsmith the embankments follow the backbone or the edge of ridges, as previously explained, and therefore they could not have resulted from ploughing.

FORT BENNER

After this report had been put in type, Mr. Allen R. Benner, Professor of Greek in our Academy, called my attention to an embankment on the north side of the Shawsheen river. Mr. Benner had discovered this during one of his canoe trips up the Shawsheen recently. I immediately visited the place and found an embankment and ditch over 600 feet in length. The embankment is the highest, and the ditch the deepest of any of the works herein described. It is also more massive than the embankments at Millis. Mr. Smith made a survey, but the exploration of this interesting place will be deferred until next spring, when a more thorough investigation is to be carried on at all of these earthworks. Meantime, it is well to state that Fort Benner, as we have named the place, lies across the river from Fort Shawsheen. The upper end of Fort Benner is about opposite the lower end of Fort Shawsheen. It is quite possible that there was a village on the tongue of land protected by this embankment. The river makes a bend here, and there is a little sandy plateau back of the fort which appears as if it were a favorable place for an Indian encampment.

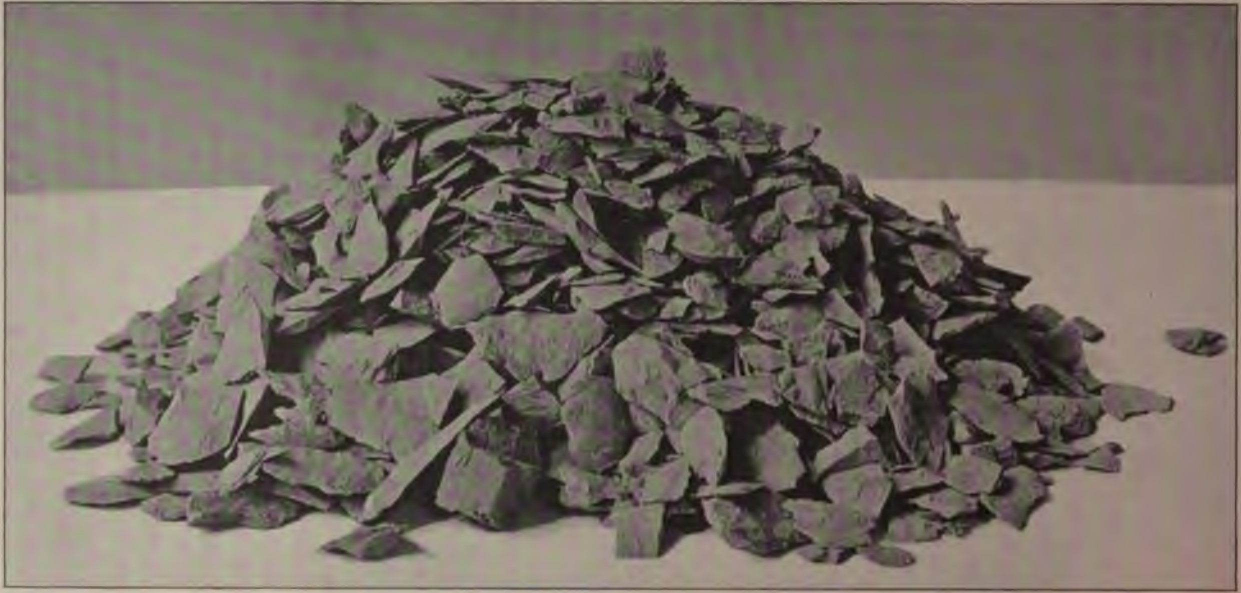


FIG. 14 — MASS OF FELSITE, QUARTZITE AND OTHER FLAKES FROM FORT GRAHAM. STATION 5

S. about 1-4

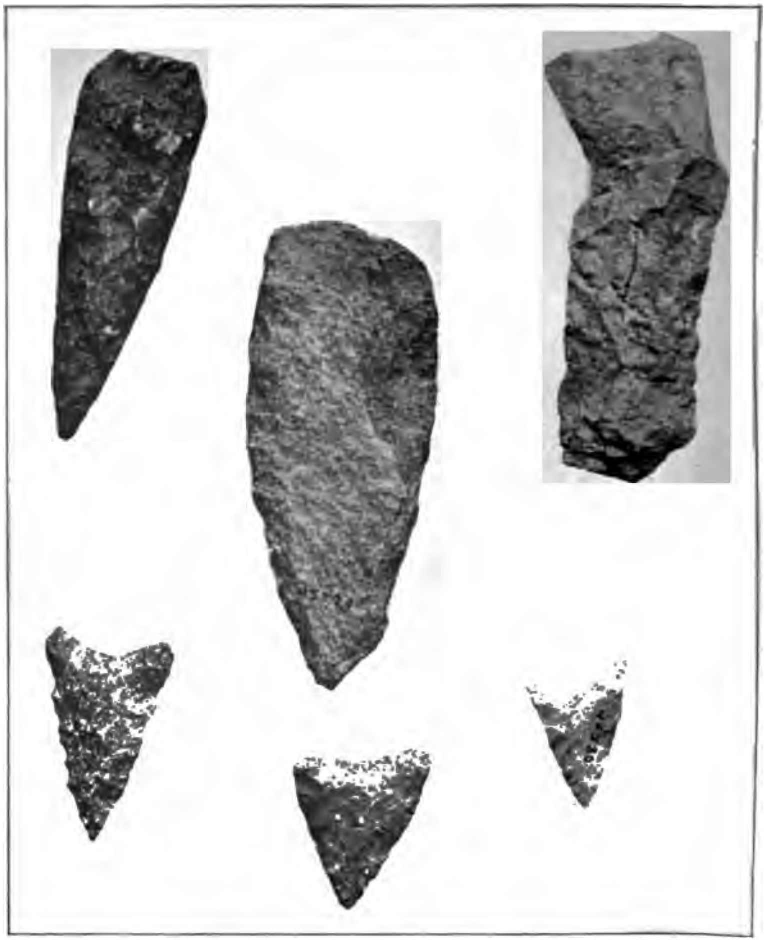


Fig. 15 — KNIVES AND PROJECTILE POINTS OF FELSITE, QUARTZITE AND WHITE QUARTZ

Fort Graham S. 2-3

FOSTER'S POND WORK

One of the strangest of these works is the one at Foster's Pond. Here the ditch is deeper than at any other point in the several works examined, but the wall is not quite so prominent. Whereas, the other works are on high ground for the most part, the Foster's Pond Fort is for the greater part in a low and swampy place. In fact, it extends over soft, wet ground for some distance. Then the wall continues over a gentle hill and terminates at the edge of a good-sized pond. This pond has been formed in historic times by mill owners placing a dam some distance away in order to obtain water power. However, before the dam was constructed, the land was low, the place swampy, and a sluggish brook meandered through what was then a broad valley.

To me, the Foster's Pond earthwork is more of a puzzle than any of the others. At Fort Graham the ditch is on the side flanking the high bluffs to the East, and the supposition is that the natives were protecting themselves against attack from the plain beyond. At Foster's Pond the embankment is toward the high land westward, and the ditch on the low side toward the swamp, this would indicate that the natives were holding the swamp or low ground. If so, the attacking party would have no difficulty in throwing arrows from the high ground far over and beyond the supposed defensive works. But the ditch here is much deeper than elsewhere, and the persons holding the fort would be under ample protection.

Foster's Pond work serves to mystify us the more as the conditions are exactly reversed from those found at Fort Graham.

We apply the word Fort in describing these places, although it is difficult for us to conceive how the works could have been of any particular value. They are so extensive that it would require a large number of men to maintain them. Furthermore, there is no evidence of considerable population in or about any of these places.

Several persons have mentioned the question of drainage. This can be dispensed with easily as the works are found at various elevations and angles, and the supposition that they would be of any service in draining lands is preposterous.

CHARACTER OF IMPLEMENTS F

Several of us spent considerable time searching these earthworks are located, and also the adjace Little of consequence was discovered, and I sen Stickney on a collecting tour throughout the entire spent thirty or forty days in careful search of both and cultivated fields and "sand blows". The latter places among collectors in this part of New England, blows away and leaves stone objects exposed. In all searching, less was found than we recovered in excav the circular depression near station 4 of Fort Graham.

The illustrations presented in this pamphlet show the implements discovered. I am indebted to Professor Haynes of [illegible] for identifying the materials of which are made.

The materials from Fort Shawsheen are Wakefield felsite, quartzite and slate.

At Fort Graham the stone found is green felsite of the Melr quarry. There is a beautiful green hornstone in evidence, but t locality whence it came is not known. The Wakefield felsite an quartzite are common.

Professor Haynes says: "I have found the Wakefield felsite to be the stone most plentiful in all sites north of the Charles River, and it shows various colors of patination."

The implements themselves are not different from the average types found in New England, and need no explanation. But I would call attention to the predominance of the triangular or "war point." More of these were found than any others. It is also to be observed that the implements are very rude and rough. There is no evidence of any considerable skill in their manufacture.

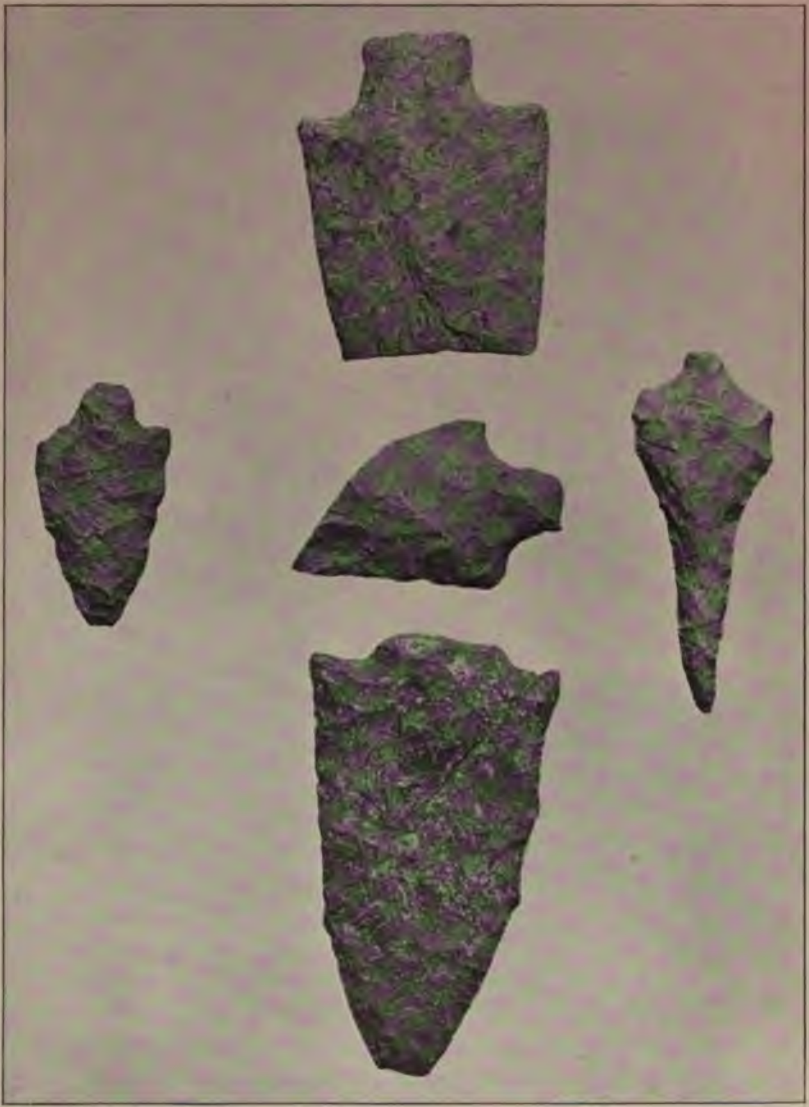


FIG. 16 — CHIPPED IMPLEMENTS, FORT GRAHAM
S. 2-3

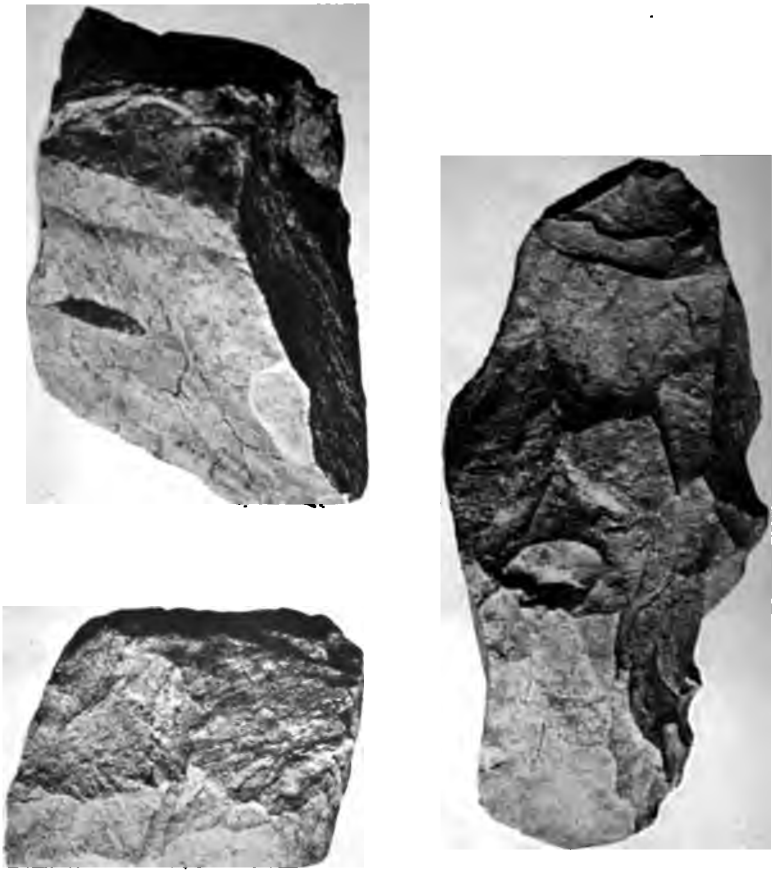


FIG. 17 — MATERIAL IN PROCESS OF MANUFACTURE
Fort Graham S. 1-2

HISTORICAL REFERENCES TO INDIAN FORTS

In our multitudinous historic works dealing with the Indians of the East there are references to various rude barricades made of logs, brush, or earth, and employed at various times in the historic period when the Indians were fighting among themselves or against the Whites. Some of these, however, give a few details as to the embankments and ditches.

I am indebted to Mr. Roland G. Hazard for a copy of his oration delivered at the unveiling of the monument commemorating the Great Swamp Fight of December 19th, 1675. This little volume presents a brief history of the famous fight and contains a bibliography of matters pertaining to the Narragansett country.

I wrote to Mr. Hazard for further information, and he informed me that the fort wall has been nearly obliterated by ploughing, but is in places still two feet high. The following taken from page 32 of a recent publication, is of interest:—

"After marching through the deep snow many weary miles, in the words of a contemporary writer: 'About Noon, they come to a large swamp which, by reason of the frost all the night before they were capable of going over (which else they could not have done). They forthwith in one body entered the said swamp and in the midst thereof was a piece of firm land of about three or four acres of ground whereon Indians had built a kind of fort, being palisado'd around, and within that a clay wall, as also felled down abundance of trees to lay quite around the said fort, but they had not quite finished the said work.'" *

The following reference taken from the "Hand Book of American Indians" (page 471), will suffice.

"The fortress built by King Philip in the swamp at South Kensington, R. I., consisted of a double row of palisades, flanked by a great abatis, outside of which was a deep ditch. At one corner a gap of the length of one log was left as an entrance, the breastwork here being only four or five feet high; and this pas-

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* *A Record of the Ceremony and Oration, on the Occasion of the Unveiling of the Monument Commemorating The Great Swamp Fight, December 19, 1675, in the Narragansett Country, Rhode Island.* Rhode Island Society of Colonial Wars, Boston, 1906.

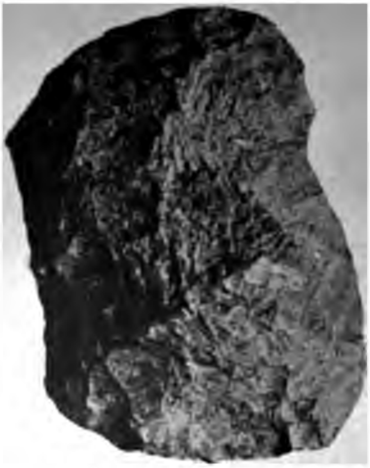


FIG. 18 CHIPPED OBJECT. USE UNKNOWN
Fort Graham S. 1-1

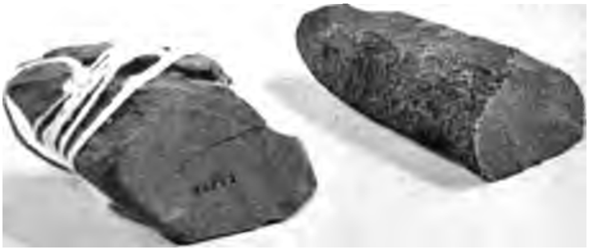
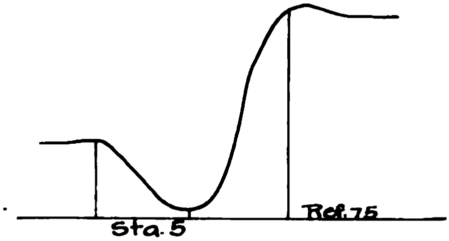
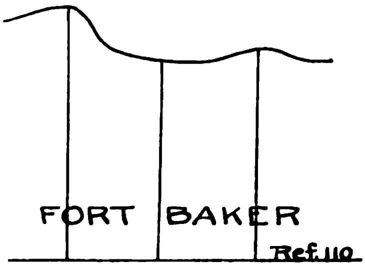
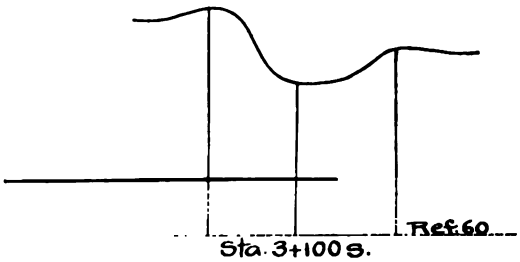


FIG. 19 — SANDSTONE AND TRAP OBJECTS
Ends Rubbed Smooth. Fort Graham
S. 1-1







HORACE HALE SMITH,
ENGINEER, ANDOVER.

sage was defended by a well-constructed blockhouse, whilst the ditch was crossed by a single log which served as a bridge."

In the "American Anthropologist", Volume VIII, (1906) pages 115-132, Mr. Charles C. Willoughby presents an able paper entitled "New England Houses and Gardens." Some of the pages of this paper are devoted to forts. The paper indicates a great deal of reading on the part of Mr. Willoughby and he cites some twelve or fifteen authorities as to the use, the construction and the character of Indian forts in New England. I suppose that his investigations led him to cover the ground thoroughly, so far as historic fortifications or enclosures are concerned. If this is true, it is interesting to note that the kind of forts or enclosures referred to by these many authorities are much smaller in extent that the walls and ditches of the seven forts described in this pamphlet. The fort of the Penobscot Indians mentioned by him was 70 x 50 feet; "that of the Pequots in south-eastern Connecticut, enclosed about an acre of ground and contained sixty or seventy wigwams." This was circular. "Phillips fort was on elevated ground three or four acres in extent in the middle of a hideous swamp."

It will thus be seen that the colonists refer to much smaller and different earthworks from the kind we have surveyed and described.

In his description of the gardens and cultivated fields of Indians Mr. Willoughby quotes from the records of the explorer Champlain. Champlain observed some trenches in the sand on the slopes of hills and in these the Indians placed corn and removed the commodity as needed. Champlain stated that three or four feet of earth was placed over the deposit and the corn was in large grass sacks. Corn might have been stored in a short trench or circular pit but it is not probable that the natives of this part of New England would dig upwards of three miles of trenches* and flank same with a continuous ridge, for the purpose of storing corn. The amount of corn that could be placed in the trenches of these seven forts would exceed in quantity, it is safe to assume, that possessed by the entire Indian body of Massachusetts during two of their most prosperous agricultural seasons.

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* Andover and Millis works combined.

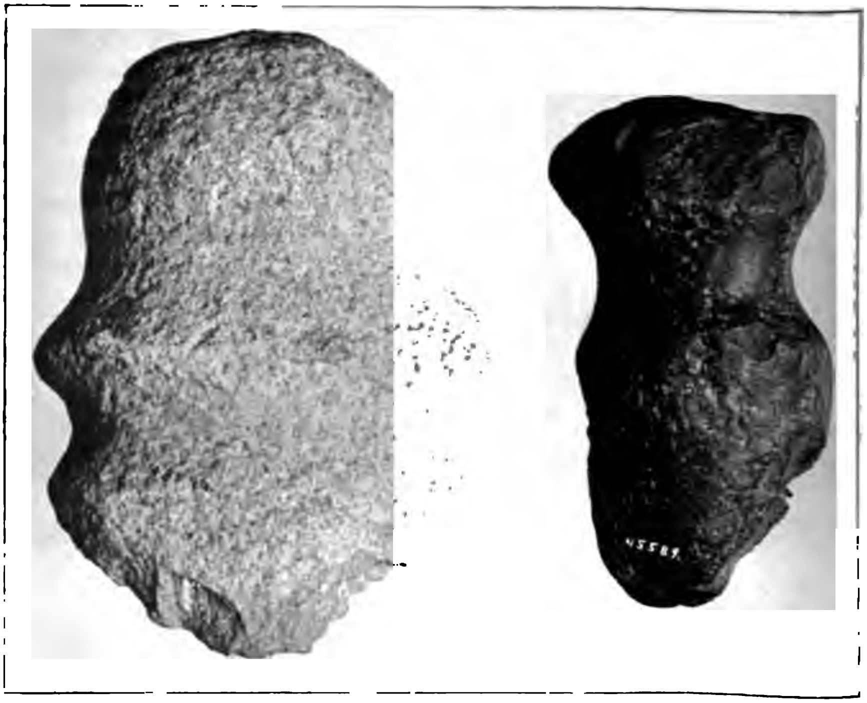

FIG. 20 — AXES (BROKEN) FOUND IN FIELDS NEAR FORT GRAHAM BY WALTER STICKNEY S. 1-2

WERE THESE WALLS ERECTED BY THE NORSEMEN?

While I do not myself believe in this theory, yet to be fair to all concerned and include every possibility, it should be mentioned. The late Professor E. N. Horsford was a firm believer in the supposition that the Norsemen once settled near Boston and left various remains along the Charles River and at other points.

Professor Haynes has kindly looked up the various references pro and con and sent me numerous citations from Professor Horsford's published articles. I cannot go into this subject at length here, but intend to thoroughly examine the so-called Norse remains before publishing the complete account of these New England earthworks.

That Horsford found strange and unexplained embankments, no one will deny. Especially is this true of the long wall and ditch at the junction of Stony Brook and the Charles River. Mr. Willoughby told me that he was not prepared to say that the Stony Brook work is Indian. It does not appear to be Indian to me, yet what purpose it would serve the Whites of the Colonial period, is open to question.

In studying the Norse theory as to origin of these places, one must remember that Norsemen did not use stone tools, but employed iron and other substances for their weapons. These would totally disappear in this climate and leave not a trace. Also, if their houses were of wood — and that was more convenient than stone — these had vanished long before the settlement at Plymouth Rock. We must look for their graves, etc., if we would secure evidence. Also, their inscriptions.

Readers may be interested in the various reports and articles Professor Horsford published. I present three of the titles: — "The Discovery of the Ancient City of Norumbega," 1880; "The Problem of the Northmen," 1889; "The Defenses of Norumbega," 1891.

It would seem that Professor Horsford thought there were quite a number of Norsemen here, and that they became merged with the Indians. Whether one inclines to his opinion or not, one must admit that Horsford spent a great deal of time in searching not only the sites, but also the Sagas, the records and the history of the people he was persuaded were responsible for the erection of these curious embankments.

As to what service these earthworks would be to Indians, I leave to others to decide, as stated earlier in this pamphlet. But I would like to suggest that it is my conviction that these earthworks are very old. They do not appear to be recent. Whether they were erected at a time when there was a considerable Indian population in New England, it is impossible to say with certainty. As they are not very large (compared with Western earthworks) it is not beyond the power of one or two thousand Indians to have constructed all of them within a period of a few weeks, during the summer or fall when digging was comparatively easy. Our forts may have been thrown up in anticipation of an attack, and the attack did not occur. If such an attack had occurred, and there were large numbers of natives on each side, we would find the usual chert and stone implements of warfare. It is not conceivable that they could have been constructed by a few Indians, for the embankments are too extensive. A small band would not need upwards of three miles of embankment to protect itself.

If these works had been inhabited when the colonists were here, our forebears would certainly have referred to the fact. They mentioned numerous villages and forts in other places. But the log and brush forts of the historic Indians — even including the small embankments and ditches — are not to be compared with Shawsheen, Graham, Goldsmith or Millis. Shall we say that these are not defensive works?

No one at all familiar with Indian remains can affirm truthfully that these are modern. I have already commented on the dearth of village site material everywhere noted save at Haggett's and Millis.

Millis may have been a fortified village; at least a part of it. The land is better suited to wigwam locations and the pond looks as if it was a good place for trapping or wild-fowl hunting in ancient times. The Charles River is near at hand, and travel by canoes to the ocean shore was feasible.

Professor Henry W. Haynes examined Forts Graham and Goldsmith. He considered them quite puzzling, but inclined to the opinion that they are of Indian origin.

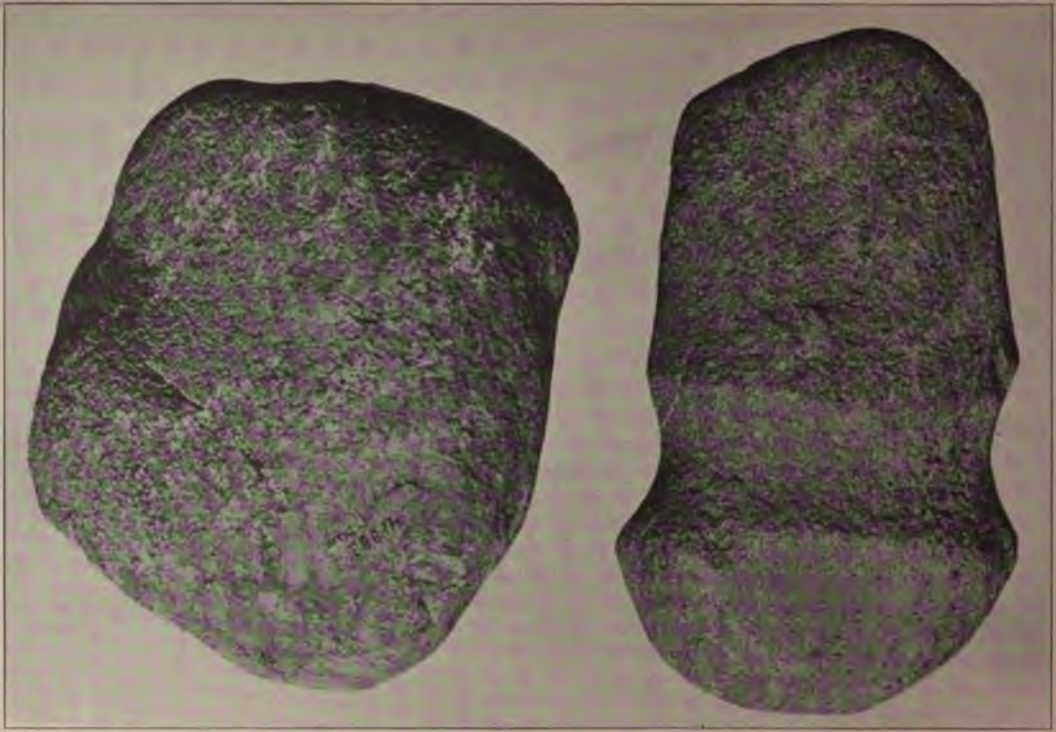

FIG. 21 — AN "ANVIL" OR UNKNOWN STONE AND A GROOVED AXE

Found by Singleton Moorehead near Pomp's Pond S. 1-2

It is just possible that the tribes living along the Merrimack River — for most of our eastern Massachusetts Indians resided near or on that river or along the coast — feared a general attack from a powerful enemy. They retreated to the Foster's Pond region inland, and up the Shawsheen and constructed these works; but the works were not occupied for any length of time. Thus we have another supposition.

Having offered all the explanations which first suggest themselves, and finding none of them entirely satisfactory, one resorts to the final theory that possibly they are not defensive in character at all. It is quite likely that we have not solved their true purpose. They may have been constructed to turn the game in a desired direction during some great game drive. Against this supposition there is to be considered the dearth of information to the effect that the New England Indians engaged in game drives on a large scale. I do not think that the idea of game drives appeals to me except in the case of Fort Shawsheen. Here, the long embankment, crowned with logs or heavy brush would keep the game within a confine twenty to sixty feet wide for a distance of nearly a mile. Game attempting to swim the river could be easily captured or killed.

However, I do not claim that the works were constructed for either of these purposes. It will require a great deal of study, research, and exploration to solve the riddle presented us Beyond question it is no easy task to interpret these places. That they meant something of consequence to the aborigines is self evident. That they should occur here in New England where so few Indian remains of magnitude have been found, is both surprising and important. That these seven works and the one at Millis are not easy of solution renders them all the more interesting to archaeologists, and we should bend our energies towards obtaining more light upon the purpose of their construction.

CONCLUSIONS

In the foregoing pages I have commented on the various theories as to these earthworks. Little remains to be said. We may sum up our observations thus: —

First; Forts Graham, Goldsmith, Baker, Shawsheen, Benner, Haggett's and Foster's Pond were not constructed by white people to control forest fires.

Second; they are not boundaries of lands.

Third; they were not for purposes of drainage.

Fourth; they were not built by the Whites during the Colonial or French and Indian wars.

Fifth; they are supposedly of Indian origin.

PHILLIPS ACADEMY, ANDOVER, MASSACHUSETTS
DEPARTMENT OF ARCHAEOLOGY

BULLETIN VI

Hematite Implements of the United States

Together with Chemical Analysis of Various Hematites

By WARREN K. MOOREHEAD, Curator

PRICE 50 CENTS (POSTPAID)

ANDOVER, MASS.
THE ANDOVER PRESS
1912

PAGE
ematite Indian Artifacts showing chemical change in
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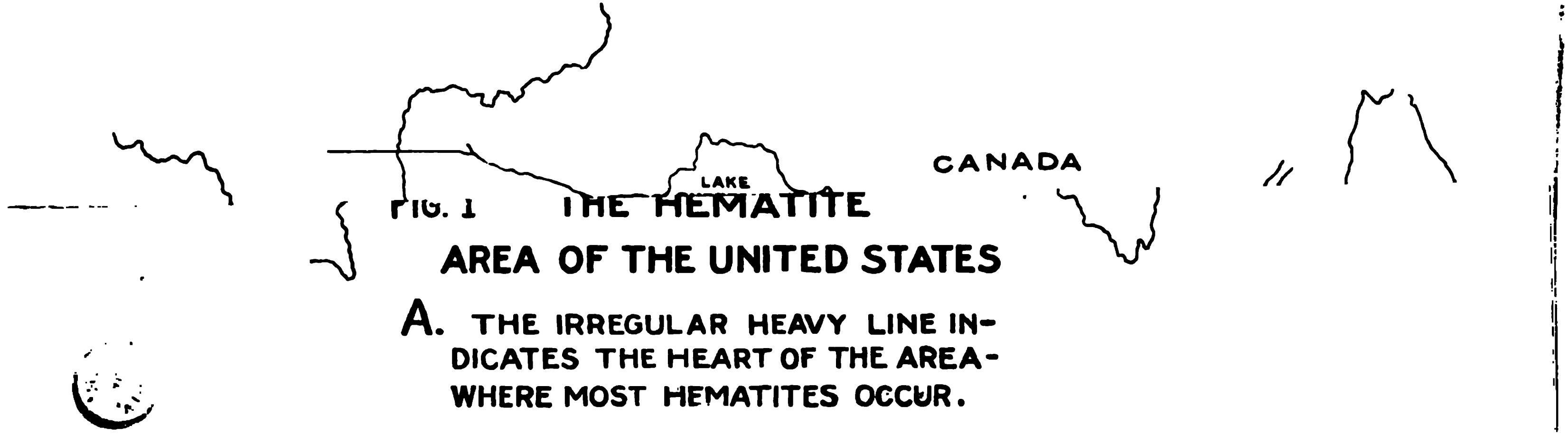

FIG. 1 THE HEMATITE AREA OF THE UNITED STATES

A. THE IRREGULAR HEAVY LINE INDICATES THE HEART OF THE AREA-WHERE MOST HEMATITES OCCUR.

ACKNOWLEDGMENT

I desire to thank several persons who have been of assistance to me in the preparation of this Report. First of all, Dr. H. M. Whelpey of St. Louis has my gratitude for his hearty coöperation. He placed at my disposal his data and collection.

I am also indebted to Professor Wm. H. Holmes of the Smithsonian Institution for permission to reproduce his paper upon the Missouri paint quarry and to Dr. J. F. Snyder of Virginia, Illinois, and Mr. H. M. Braun, East St. Louis, Illinois, for information. Professor Wm. C. Mills counted and classified the hematites in his exhibit, and has my thanks. The following persons replied at greater or less length to requests for data as to Hematites. I thank them all.

Mr. F. P. Graves, Mr. Clarence B. Moore, Dr. George G. MacCurdy, Miss H. N. Wardle, Messrs. Luther A. Norland, Dr. W. C. Barnard, H. F. Burkett, Frank L. Grove, Dr. Charles F. Noe, John W. Wright, and others.

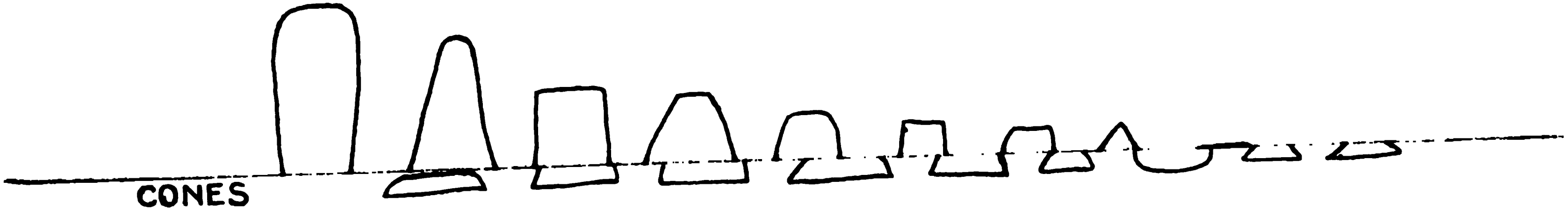

FIG. 2
OUTLINES OF HEMATITE TYPES

GENERAL OBSERVATIONS ON THE HEMATITE AREA

The distribution of objects of various forms of iron ore, ferruginous stone or hematite is general through more than half of the United States. Setting aside remote portions of the country where very few objects of stone carrying iron, or iron oxides predominate, one may roughly bound the territory in which hematites are found as follows:—From Fort Worth, Texas, straight north through Oklahoma, Kansas and Nebraska to Omaha, north to Minneapolis, then to Duluth, east to northern Michigan, thence to Ottawa, Canada, south to Trenton, New Jersey, thence to Raleigh, North Carolina, thence to Montgomery, Alabama, and west to Fort Worth, Texas. Implements of hematite are occasionally reported outside of this area; but after careful study of specimens in public institutions, correspondence with persons familiar with the types existing in their localities and the reading of numerous reports and papers, it is my opinion that the great country enclosed within the bounds referred to constitutes the so-called hematite belt.

Within this territory hematites are most numerous in Missouri, southern Iowa, Illinois, Indiana, Ohio, West Virginia and Kentucky. They are found in considerable numbers in Tennessee, New York, Wisconsin, and portions of Arkansas. But while that is true, the far greater number of these implements lie within a territory about the size of the state of Texas.

The preponderance of these objects are not found with burials in mounds or graves, but upon the surface, and it does not follow that wherever a hematite object has been picked up there at one time existed a camp or village at that particular spot. True, implements made of this ore sometimes occur with burials of various sorts but not in sufficient number to indicate clearly the use and purpose for which some of the types of hematites were made.

Wherever quantities of hematite implements finished or unfinished occur, and especially if there are other indications of human occupation such as village-site debris, it is self-evident that a village of more or less permanency occupied that site. However, it would appear that the knowledge we are to obtain

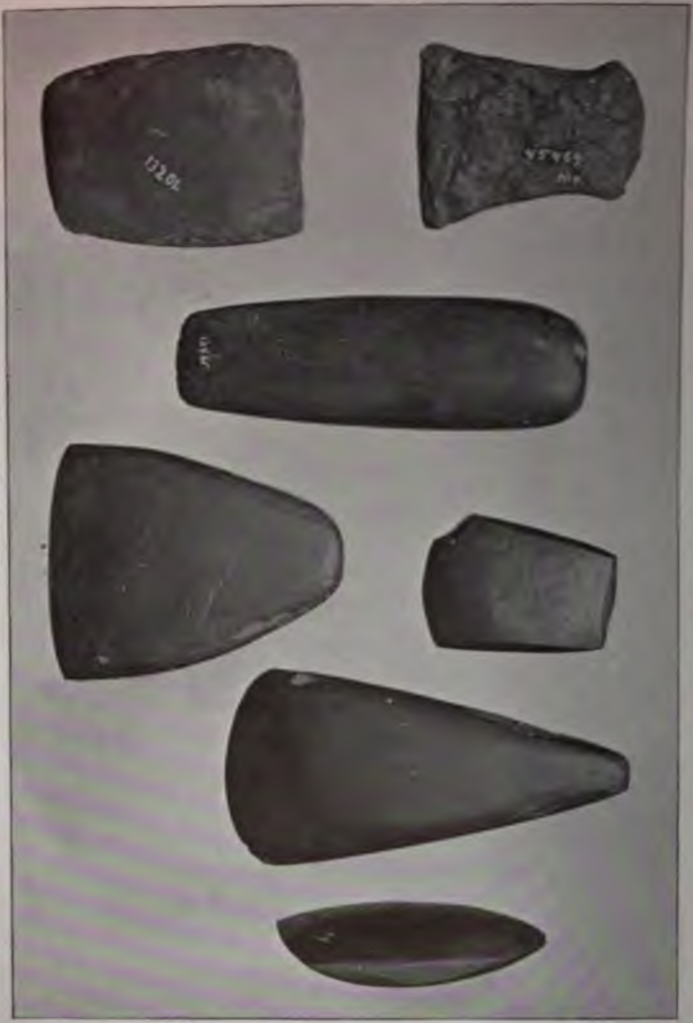

Fig. 3 S. 3-5. ANDOVER COLLECTION

Group of hematite celts. The square, oval and pointed types.

from these implements, must be through a study of them *en masse*. And with that end in view I have assembled all the observations of other writers and have done what little I could to clear the mystery.

In order to compare the hematites of different colors and apparent varying hardnesses, I asked Mr. James C. Graham, head of the Department of Science, Phillips Academy, to make careful analysis of implements of several kinds, and these analyses will be found on page 51 of this report.

The distribution of hematite objects seems somewhat different from those of other forms of prehistoric artifacts. The bicave or discoidal stones overlap the territory of hematites, but cover less in extent. The bird-shaped stones so common north of the Ohio river are rare in sections where hematite implements abound; notably Missouri.

A careful study of these hematites will aid us in determining the general distribution of other and different types. For I am persuaded that in the past we have given scant attention to the technical study of these and other forms of implements.

Having established the various areas in which certain types occur it may be possible, some years hence, for us to arrive at conclusions. Without such study, we must regard these objects as problematical forms — as we have in the past — occupying case room in our exhibition halls and of no particular meaning or consequence.

Beyond question, we have far too many such exhibits — of types concerning which we, as yet, know little. While this pamphlet presents no final solution of the "hematite problem," surely there can be no harm in classifying these hematites and in calling attention to certain facts, although in our study we have little to aid us save the specimens themselves. Our histories, or narratives of travels among Indians are silent on the subject. Archaeologists have done no more than to mention them briefly. Therefore we must depend on an examination of types.

And if we depend on archaeology alone our study is confined not only to the specimens themselves, but must of necessity be analytical in character.

In stating that the many narratives of travelers, the observations of ethnologists and others sent among Indians, are of little or no value to us in making clear the purpose of these peculiar objects, I mean that in so far as my observation and reading extends, I fail to obtain any certain light on this subject. If there are specific references to objects made of hematite in the records of early travelers in America, I stand corrected. Up to the present time we have few references at any length to these specimens. Such as one may consider of importance are presented in the bibliography on page 100 of this report.

We do not need to concern ourselves with a study of hematite throughout the world. The softer grades of iron ore and the oxides were used by primitive man pretty generally, it it is safe to assume. That is, they furnished him with paint. Outside of the United States hematite does not seem to have been made into implements or ornaments.

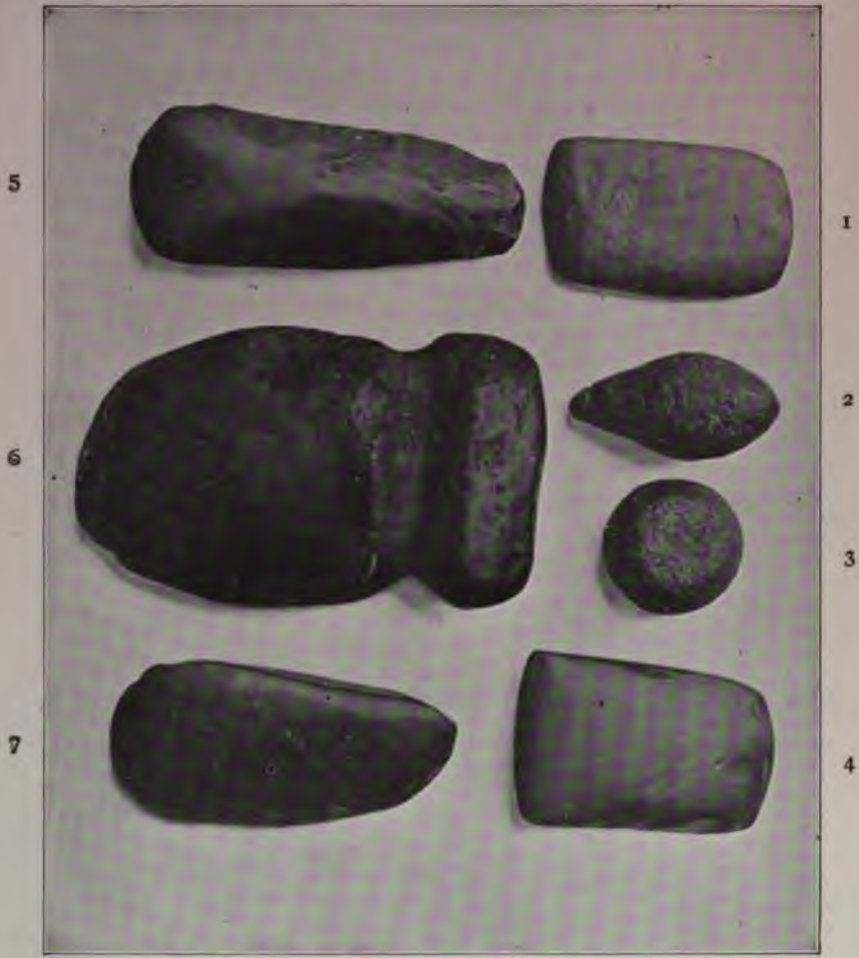

FIG. 4. TYPICAL HEMATITES S. 1-2

These are from the collection of Geo. Y. Hull, St. Joseph, Mo.

1. Celt from mound, Andrew County, Missouri. Smooth and well made but not polished.
2. Plumb much pitted by age, surface find. Callaway County, Mo.
3. A fine truncated cone used as a paint grinder. Top of cone is worn and depressed from use. Surface find. Callaway Co., Mo.
4. Finely polished celt, surface find. Doniphan Co., Mo.
5. From an old grave near the village-site at Wathena, Kansas.
6. Axe with flat top and flat side,—a surface find, Callaway Co., Mo.
7. From an old village site at King Hill, St. Joseph, Buchanan Co., Mo.

The difference between the celts is self-evident, number 1 and 4 being square, and 5 and 7 oval.

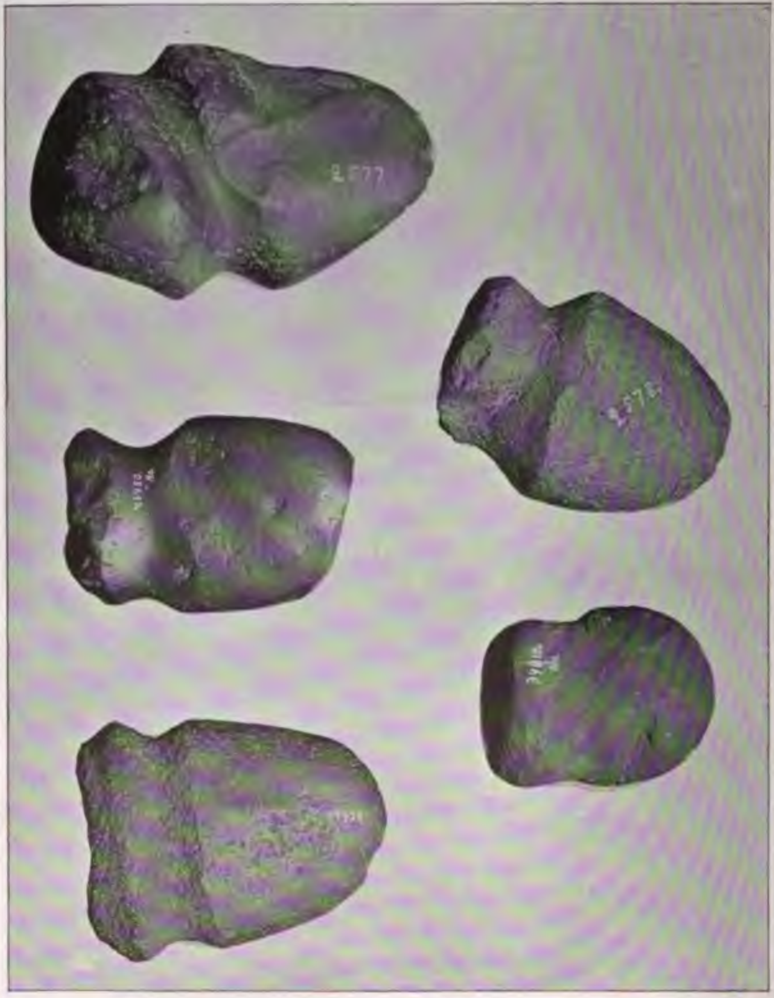

FIG. 5. S. 2-5. ANDOVER COLLECTION.
Grooved axes from Missouri. The more common forms.

HEMATITE IN THE PALAEOLITHIC AGE

No one denies that the caverns and rock shelters of the south of France and particularly the valley of the Vézère near Les Eyzies, where about sixty caverns occur, represent the habitations of the most primitive man. In fact, in the lower layers of these caverns in the epoch known as Acheuléan, the implements indicate that man was but slightly in advance of the being represented by the Chelléen type found in the gravels of Abbeville and at St. Acheul, farther north.

In the period embraced from 1860 to about 1871, Messrs. Edouard Lartet and Henry Christy made their famous explorations of caverns in southern France. On page 22 of Reliquiae Aquitanicae, their beautiful report, (a report, by the way, equal to anything published by either the French or the English since) they make this statement: " Various pieces of soft red hematite, covered with scratches, indicate how they scraped off a red powder which, mixed with grease, would furnish as good means of personal adornment as is employed by many Indians at the present day."

When in France last summer, I visited Les Eyzies, spent over two weeks inspecting a number of the caverns and was interested to observe in the collection of Mr. Otto Hauser a number of fragments of soft hematite which palaeolithic man of thousands of years ago undoubtedly used as paint for personal adornment.

Interesting as this subject is, it is not my purpose to enter upon a discussion of the widespread use of hematite as a paint among savage people in other countries. The fact remains, it must have been, quite probably, the favorite paint, as it has bright red, light red, brown, and sometimes almost yellow colors and existing in very many parts of the world it was appreciated by the earliest man, beyond question.

Whether he made implements or ornaments of the heavier and harder hematite in foreign countries, as he did in America, is a question I leave to the consideration of students more familiar with the European field.

In our own country the hematite was not only made use of for decorative purposes, but it served for a multitude of implements and weapons and a few ornaments and game stones.

THE CLASSIFICATION OF HEMATITES

I made a primary classification of hematites in "The Stone Age in North America," Volume II, page 301. While this is more or less correct, it is a skeleton classification and should be expanded.

The Committee appointed by the Anthropological Association of America to formulate a primary classification and nomenclature of prehistoric artifacts did not consider the hematite objects. Therefore the following classification is submitted upon my own responsibility, and I shall be very glad to have others indicate wherein it should be expanded or contracted.

Apparently tools	Edged objects	Celts	Oval form
			Square form
			One face convex, other face beveled square form, broad edge, pointed poll
		Grooved axes	Ordinary form
			Grooved in center
Oval or elongated	Plummet shape		Slender
			Rounded or egg-shape
			Pear and bell shape
	Egg shape, flattened		
Cone shape	Pointed cone		
	Mound shape, top rounded		
Paint stones			
Irregular forms			
Apparently ornaments or problematical	Tablets		
	Bicaves		
	Chipped discs		
	Pendants		
	Effigies		
	Winged and perforated		
Projectile points	Spear-heads		
	Arrow heads		

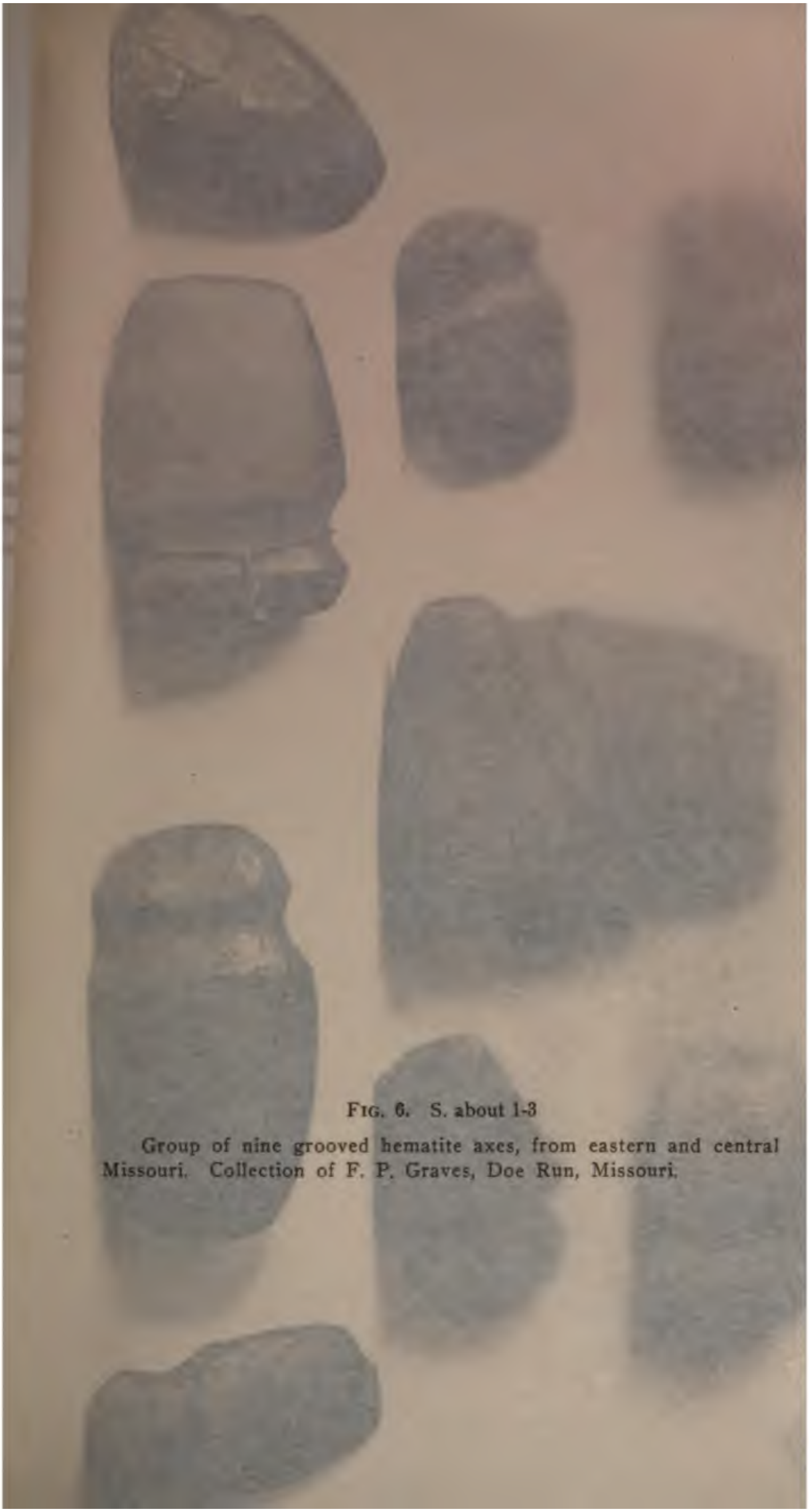

FIG. 6. S. about 1-3

Group of nine grooved hematite axes, from eastern and central Missouri. Collection of F. P. Graves, Doe Run, Missouri.

UNIV. OF MICH.

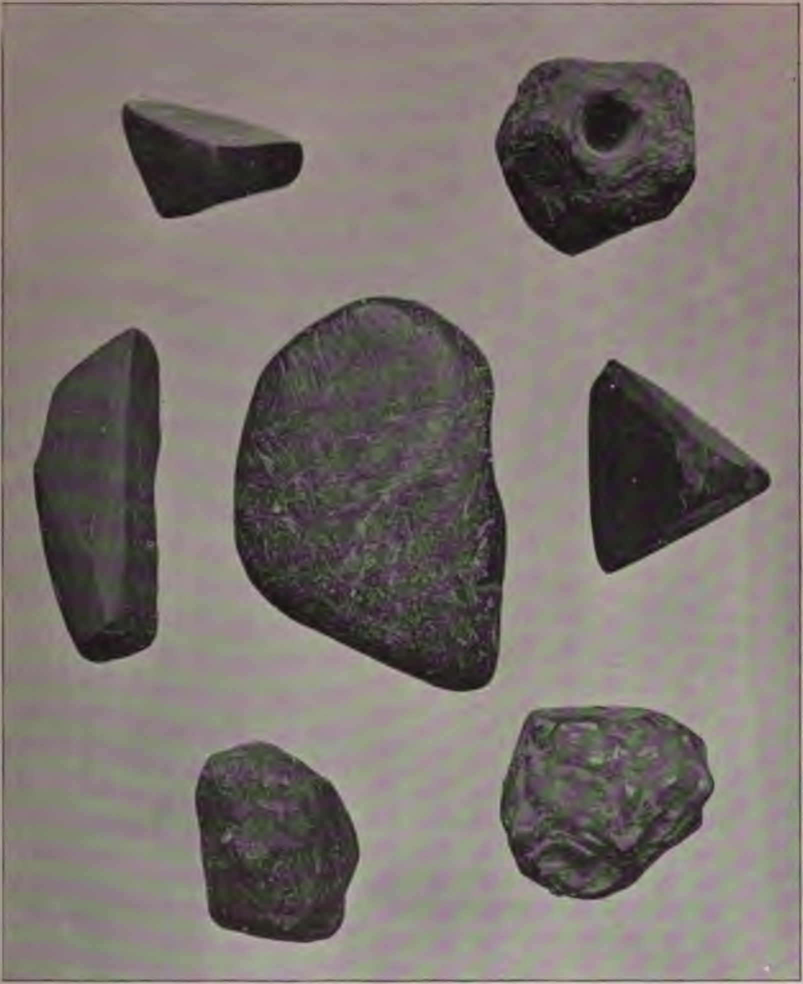

FIG. 7. S. 4-5. ANDOVER COLLECTION.

Various pieces of hematite, partly worked. Five from Ohio, one from West Virginia, and one from Kentucky.

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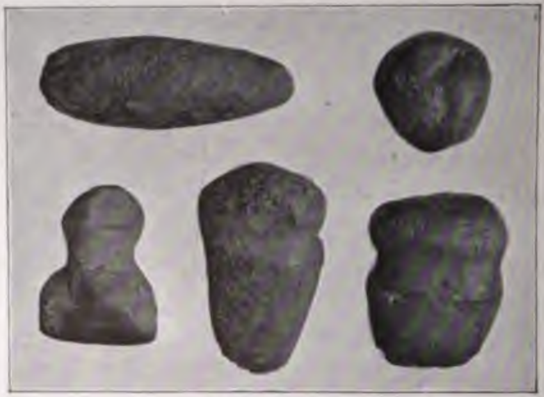

FIG. 8. S. 1-5. ANDOVER COLLECTION

This figure illustrates three grooved axes in the lower row; an unfinished hematite implement of unknown purpose and a hematite nodule above. Hematite axes are frequently found in Missouri, but seem rare elsewhere in the country. The groove may entirely encircle them, or be faintly indicated on the back. But usually they are grooved entirely around. The one in the lower left-hand corner has a broad, sharp, cutting edge. Naturally, because of its hardness, hematite made excellent axes. They retained their edges longer and more nearly approached the modern iron axe than any other aboriginal tool.

TABLE SHOWING DISTRIBUTION OF HEMATITES IN THE A. E. DOUGLASS COLLECTION

United States	Mineral Lumps	Paint Lumps	Balls and Hammers	Grooved Axes	Tomahawks	Club Stones	Celts & Cutters	Banner Stones	Gorgets	Ornaments	Grooved Plummets & Sinkers	Arrow Points	Conical, Ellip. & Hemispherical Burnishers	Pear Shaped Pendants	Totals by States
E. of Rocky Mountains	2	7	2	1			7				5		6	1	31
New York									1				1		2
Pennsylvania							2								2
Virginia									1				2		3
West Virginia		30	5			1	113		3	3	10		41	1	207
Kentucky		1					4		2		3		8	1	19
Tennessee		1				1	1						3	1	7
Ohio	3	14	5			4	177		5	2	22	3	65	11	311
Indiana				1											1
North Carolina						4							3		7
Georgia						9									9
Missouri	1	154	1	19	4	2	187	1	8	8	25	1	40	13	464
Illinois				3			7						8	14	32
Iowa							1								1
Totals	6	207	13	24	4	21	499	1	20	13	65	4	177	42	1096

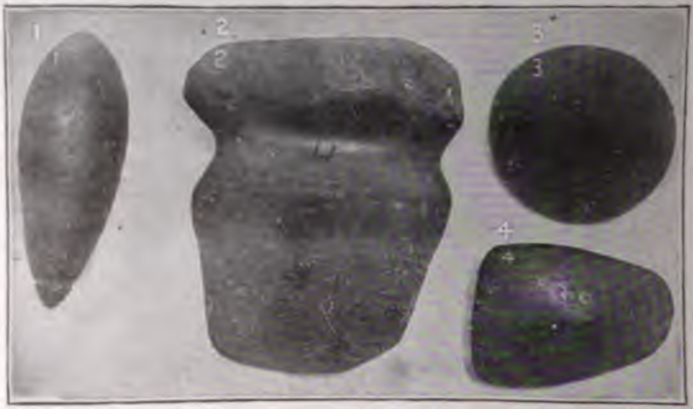

FIG. 9. S. 1-2

Hematite objects from the collection of Dr. Henry M. Whelpley, St. Louis, Missouri. Hematite plummet to the left, grooved axe in the center, a hematite cone to the right, a celt in the lower right-hand corner. All Missouri surface finds.

THE OUTLINES OF TYPES

In Figure 2 I have shown but four divisions of hematites, the celts, grooved axes, plummets and cones. The ornamental, problematical, bicave and miscellaneous divisions are not sufficiently complete to permit us to present outlines. The irregular pieces of hematite, those used for burnishers or polishers (two of Douglass' terms) and the triangular and octagonal fragments — apparently paint stones — are omitted.

The celts have more highly specialized edges than is observed in the stone celts. We have indicated this difference in the side view of the specimens. The edge of the average stone celt is seldom different from the top or poll save that it is sharp. But in the hematite celt the edge is keener, is more polished and may be beveled or slightly curved.

In the axes I have omitted the double bitted axe and the axe with the flat back, or triangular axe. These are rare in hematite. The plummets and cones or hemispheres, cover the range of unknown forms in this material fairly well. There might have been added under the plummets, the egg-shaped, grooved plummet, one side more or less flat. These are rare, but seem to constitute a type. Dr. Whelpley has about fifty of them.

The various types and sub-types of the classification will be found illustrated by specimens throughout this Bulletin as follows:

Celts

Oval form, Fig. 4, No. 7, Fig. 9, lower right-hand corner.

Square form, two in Fig. 3; Fig. 4, Nos. 1 and 4.

One face convex, other face beveled, Fig. 3, right-hand specimen.

Square form, broad edge, Fig. 3, top to left.

Pointed poll, Fig. 3, second from bottom.

Grooved Axes

Ordinary form, Figs. 5 and 22.

Grooved in center, Fig. 43.

Plummets

Plummet-shape, slender, Fig. 9, left-hand specimen, two in Fig. 31.

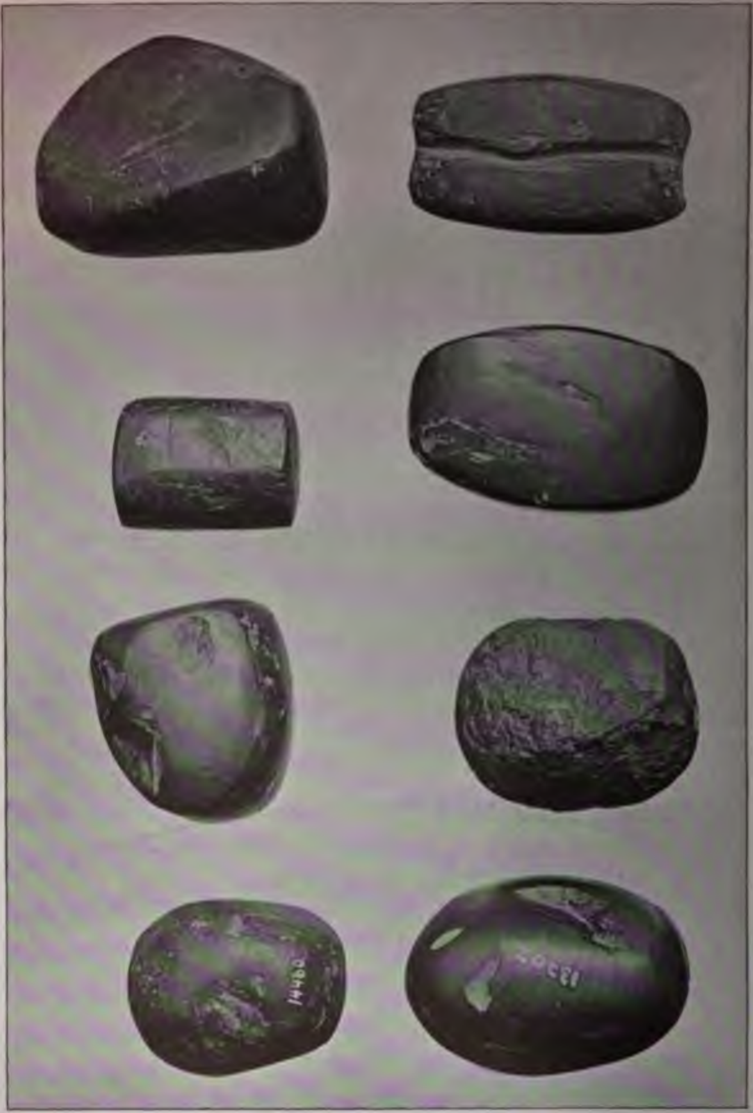

FIG. 10. S. 3-4. ANDOVER COLLECTION.

Irregular forms — all polished except the grooved one, and that one above No. 13207. All from Ohio except No. 16119, which was found in Indiana.

Plummet-shape, rounded, Fig. 31, center.
Pear and bell shape, Fig. 13, central figure, lower row.
Egg-shaped, grooved in center, Fig. 30.

PAINT STONES, CONES, ETC.

Paint stones, Fig. 7.
Rubbing stones, Fig. 10.
Projectile points, Fig. 48.
Pointed cone, Fig. 28.
Mound shape or hemisphere, Fig. 29, and one in Fig. 46.

ORNAMENTS OR PROBLEMATICAL

Ornaments and tablets, Figs. 41, 45 and 51.
Bicaves, Figs. 42 and 49.
Chipped discs, Fig. 37.
Pendants, Figs. 32 and 33.
Winged objects, Fig. 44.
Perforated, Figs. 50 and 52.
Effigies, Fig. 42, lower left-hand corner, Fig. 47.

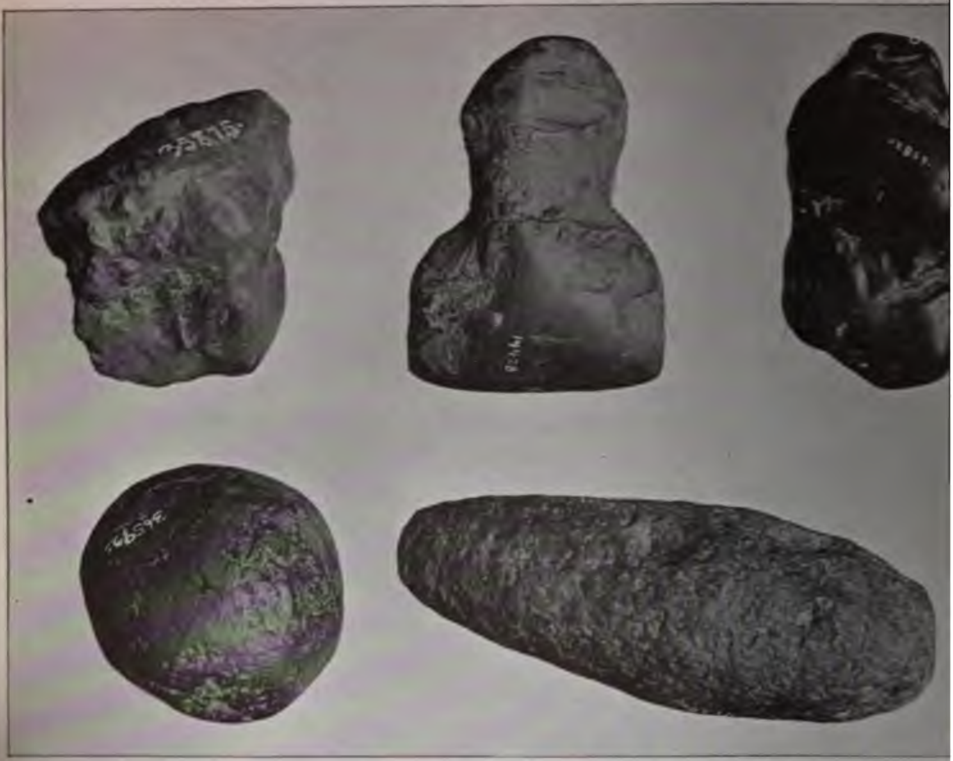

FIG. 11. S. about 1-2. ANDOVER COLLECTION

Top row — mass of hematite, a peculiar axe-celt and a nodule.
Lower row — a ball, and an unfinished object.
Three from Ohio, two from Missouri.

OBSERVATIONS OF OTHERS UPON HEMATITE

The longest reference to hematites is found in the "Handbook of American Indians," Volume I, page 542. It is written by Professor Holmes, and I quote it in full.

"HEMATITE. An iron ore much used by the native tribes for implements, ornaments, and small objects of problematical use. It is found in many parts of the country and in great abundance in the Iron Mountain district of Missouri and in the Marquette region of Michigan. It occurs as a massive ore, as nodules, and in other forms, distributed through rocks of various classes, and is usually dark in color, showing various shades of gray, brown, and red. The specular varieties are generally rather gray, and have a metallic luster. The red, earthy varieties, when compact, are known as red chalk, and when much disintegrated and pulverulent, as red ocher. They were, and are, much used as paint by the aborigines, and small quantities, either in lumps or as powder, are commonly found in ancient graves, placed there for personal embellishment in the future existence. The highly siliceous varieties are often very hard, heavy, and tough, and make excellent implements. They were used especially in the manufacture of celts, axes, scrapers, etc., and for the rudely shaped hammers and sledges that served in mining work, as in the iron mines at Leslie, Mo. Many of the celts and celt-like implements are quite small, and in some cases probably served as amulets. Grooved axes of this material are of somewhat rare occurrence, but objects of problematical use, such as cones, hemispheres, and plummets, are common, and on account of their high finish, richness of color, and luster, are much prized by collectors. Hematite objects are found in mounds and on dwelling sites in the middle Mississippi valley region in the Ohio valley, and extending into E. Kentucky and Tennessee to W. North Carolina, and to a limited extent in the South, in the Pueblo country, and on the Pacific coast. A small, well-shaped figure of this material representing a bird, and neatly inlaid with turquois and white shell, is among the collections obtained by Pepper from the Pueblo Bonito ruin, New Mexico. Hematite is

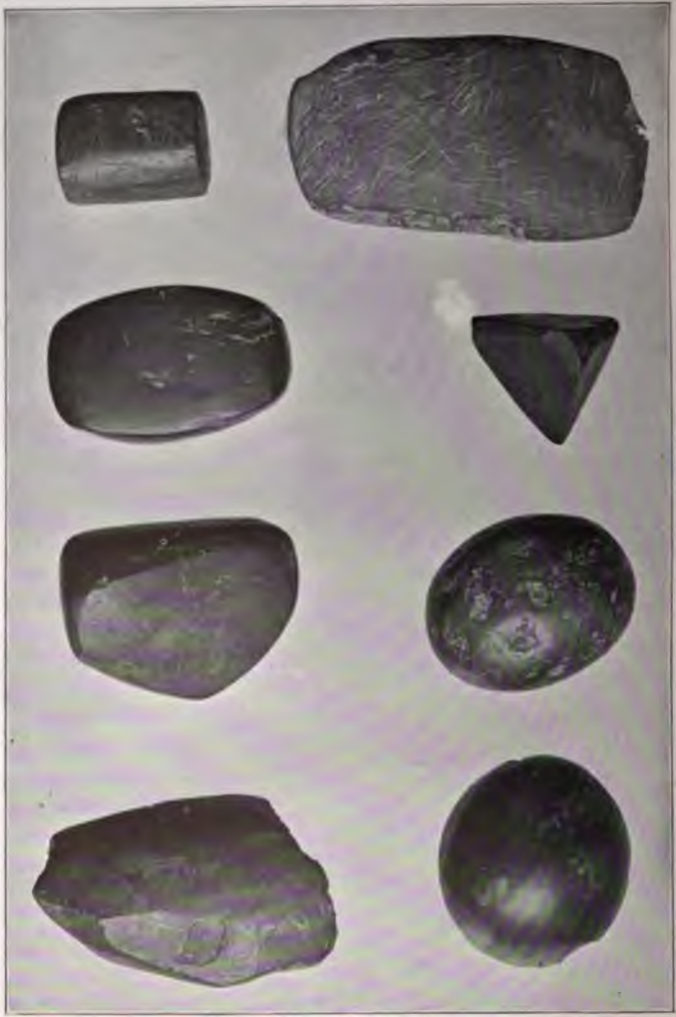

FIG. 12. S. 3-5

Eight hematite objects from the Andover collection. In the upper right-hand corner is a hematite pebble, polished on two of its angles and rough on the other side. This illustrates how hematite was cut and ground until reduced to the desired shape. Flint scratchings are still plain on the surface. Just beneath it is a triangular bit of hematite. The flat surface may be due to grinding in order to obtain paint. Beneath are two hematite cones. The four specimens to the left represent irregular pieces.

not always readily distinguishable from limonite (which is generally yellowish or brownish in tint), and from some other forms of iron ore."

During the preparation of this BULLETIN I addressed numerous letters to museum Curators, persons who had carried on more or less extensive explorations and to students of American archaeology. Their replies indicated that the area assigned is ample to include practically all the true hematites in the United States.

PHILADELPHIA, Nov. 1st, 1911

"I have met with so few hematites that it might be said with truth that I have found practically none."

CLARENCE B. MOORE.

PHILADELPHIA, Nov. 3rd, 1911.

"At Mr. Moore's request, I have looked over his collection, and find, besides the two plummet-shaped pendants of hematite — one of which is dark red and the other steel-grey — which he has referred to in his letter as having been plowed up near Brodnax, Morehouse Parish, La., two other pendants of the same general type, one — steel grey — from the Indian cemetery on the Keno place, Morehouse Parish, La., and one — possibly unfinished since there is no groove nor perforation for suspension — found with Burial No. 4 in the Indian cemetery on the Ward place, Morehouse Parish, La. This last is of a very dark grey color, almost black. Aside from these four, I have found no objects of hematite in the Clarence B. Moore collection."

H. NEWELL WARDLE.

EAST ST. LOUIS, ILLINOIS,
Dec. 27th, 1911.

"Some time ago I received from you a circular letter, entitled 'Information desired regarding Hematites,' and in reply will endeavor to convey to you my personal observation regarding same. First of all, I do not believe that an accurate estimate could be made as to which particular specimens of hematite predominate in this locality, say in a radius of 100 or 150 miles. My personal observation is as follows: grooved axes seem to predominate in Missouri, or west of the Mississippi River, with the exception of St. Charles County, at which place I feel the plummets predominate, with axes next, and celts occurring sparingly. In Illinois the order of things seems to be reversed, but no hard and fast rule can be followed. As a general proposition the Illinois hematites are better worked, but it is singular to note the difference in the frequency with which certain objects occur, in different localities, although not more than 20 or 30 miles distant from one another. In my immediate locality, say a radius of 20 miles, celts absolutely predominate, all finely polished; next comes axes, also of fine workmanship; next in order are plummets, usually good, and often very fine. The grooved plummets are the commonest, perforated plummets being scarcer, but if found at all, are very finely polished. Cones are scarce, and I only recall five having been found in this immediate neighborhood. About 30 miles north, in Jersey County and Calhoun County, and more especially along the Illinois River, a different condition exists with reference to frequency with which certain hematite objects are found. In the latter locality plummets predominate (50 to 1) celts are few, and grooved axes scarce, but more cones are found than in any other locality in Illinois. I want to qualify my statement, however, with reference to cones somewhat. Cones are very scarce in Illinois, hence I do not want to leave the impression that Jersey County, or the Illinois River country is full of cones, but to the contrary they are highly prized by collectors, and out of about fifty collections two contain cones. A few very fine polished hematite discoidals have been found in Jersey and Calhoun Counties, but these are very very scarce. Hematites become scarcer as one goes south in Illinois.

My collection of hematites consists of the following specimens:

60 grooved axes (one of which has been re-worked).

41 celts.

92 plummets (of which 9 are perforated and 3 are unfinished).

7 cones.

2 gorgets (2 perforations each) know of no others in this locality.

Of course, I have only enumerated local specimens, from a

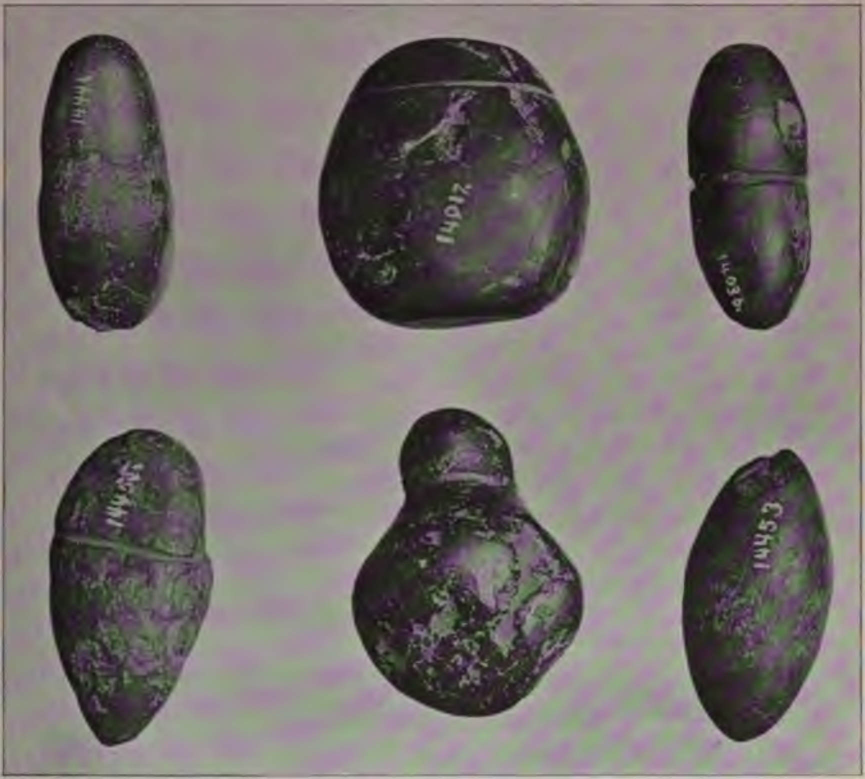

FIG. 13. S. 4-5. HEMATITE PLUMMETS FROM OHIO. Andover Collection.

Three are grooved — two in the center. No. 14446 has a pecked (not cut) groove. No. 14453 is not grooved. No. 14017 is an unfinished form — groove just begun.

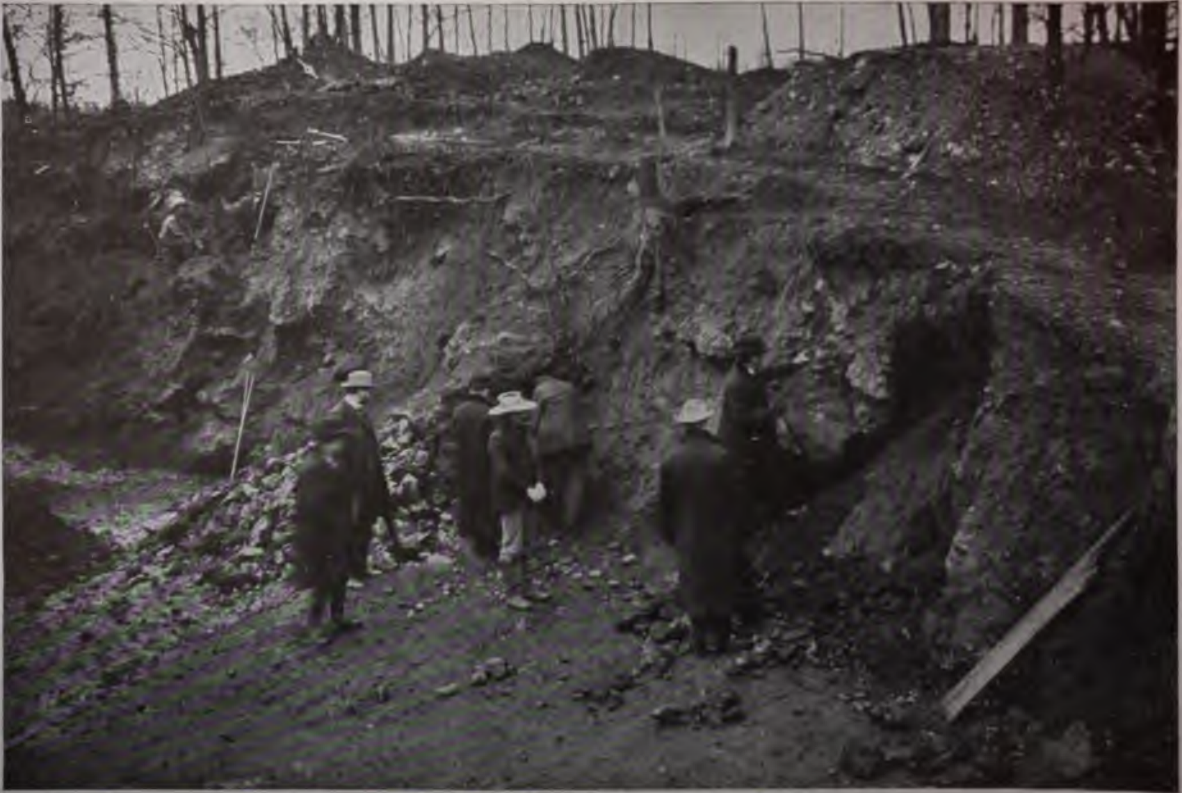

Fig. 15

View of the mine wall, showing traces of the ancient tunnels, the flint chips of the ancient open air workshops. The perforated 'tablet' I have was found with a skeleton in a Brown County mound; and three of the hematite plummets — also one of limestone — were found interred with human skeletons within 20 miles of the mouth of the Sangamon river."

DR. J. F. SNYDER

Mr. H. F. Burkett, Findlay, Ohio, who has for forty years been engaged in a study of the various types of implements found in Hancock County and vicinity, advises me under date of November 18, 1911, that he never knew of an object of hematite having been found in his region.

Doctor George Grant MacCurdy, Curator of the Peabody Museum at Yale, states that there are few hematites in their collection and all of these come from the Ohio valley.

Mr. Luther A. Norland of La Jara, Colorado, writes that he knows of no hematite objects having been found in Colorado. Mr. Norland has made an extensive collection in his region.

Doctor Charles F. Noe of Amana, Iowa, informs me that in his collection of 1500 local specimens there are but five objects of hematite. All of these are of the dark or purple hematite almost approaching black in color, and are very hard, and have been found on the surface and not with burials.

Mr. Frank L. Grove, Secretary of the Archaeological and Historical Society of Delaware, Ohio, states that very few hematites have been found in his region. He knows of none save a few celts of this material.

Dr. W. C. Barnard of Seneca, Missouri, has a large collection of prehistoric objects from his region and among these are numbers of hematites. In Fig. 53 I show a group of fine hematite axes and other forms from his collection. Apparently grooved hematite axes predominate.

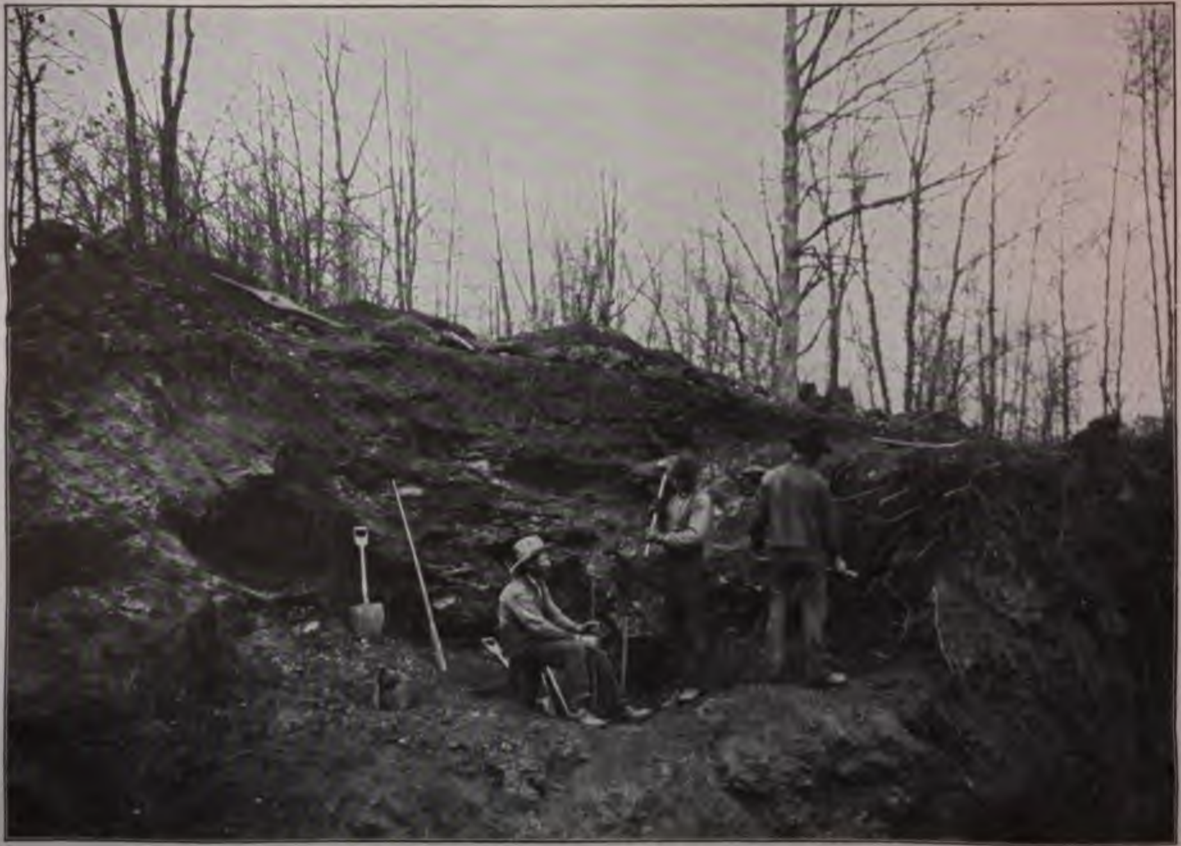

FIG. 16

DR. WHELPLEY'S COLLECTION AND STUDY

The largest collection of hematite artifacts in the United States and quite likely in the world, is that owned by Doctor H. M. Whelpley of St. Louis, Missouri. Doctor Whelpley has made a special study of these interesting artifacts for twenty-five or thirty years and it may be no exaggeration to state that he is better posted with reference to their distribution, the character of implements and the conditions under which they are found than any person in this country. Certain it is that in all correspondence our Department has had with reference to hematites, no institution or individual has been able to give us the amount of detailed and valuable information equal to that submitted by Doctor Whelpley, and I am glad to here record my obligation to him.

The correspondence with Doctor Whelpley extended from November 20th, 1911, through March, 1912. The Doctor sent me a large number of photographs of his specimens together with some fragments for chemical analysis. Omitting the dates of communications and selecting the essential facts and observations obtained by Doctor Whelpley the past twenty years, I sum up his conclusions as follows:—

In the region lying about St. Louis, and especially towards the west and northwest, the hematite is not only numerous but all colors are present from light to dark red and steel gray. These objects with few exceptions are found on the surface through cultivation of the soil. Occasionally they are washed out by the action of streams. He has secured paint stones from graves, and heard of a hematite plumb-bob being found in a grave, but the details are not available. Hematite pieces have been found around the mounds but none with burials in the mounds so far as he is informed. The frequency with which these objects occur is indicated by the table submitted by Doctor Whelpley, printed on page 40 and arranged according to preponderance.

Hematite paint from Indian graves and village sites as well as crude hematite from workshops is represented by numerous fine specimens. His collection of about 1700 specimens was found

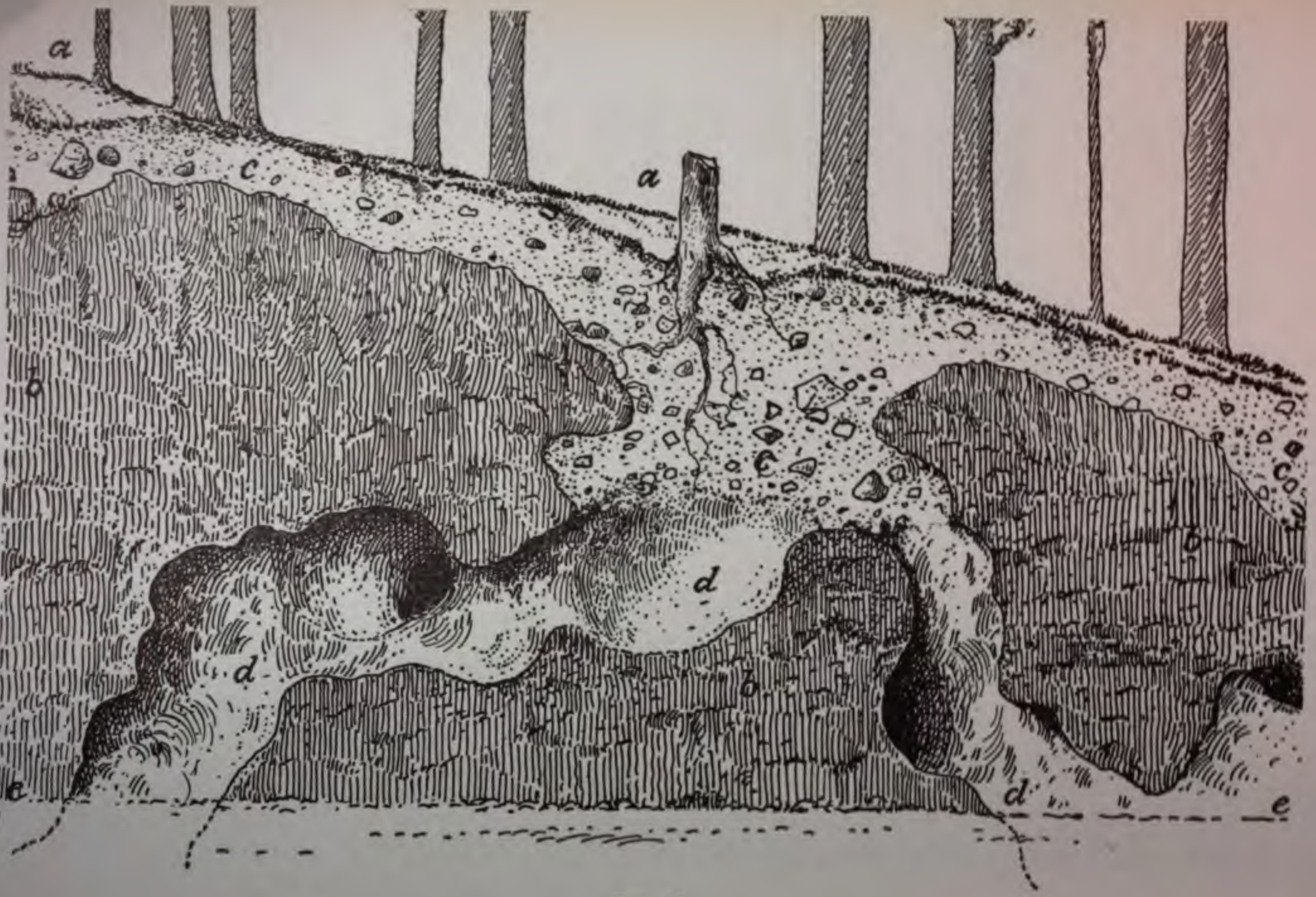

FIG. 17
Section indicating the manner in which the ancient galleries or borings penetrate the ore body.

within a radius of 150 miles of St. Louis. He has seven hematite celts said to have been found in a cache, but he is not able to verify the report.

" In the district west of St. Louis, extending to the Missouri River, hematite axes predominate. Plumb-bobs are relatively scarce. A few celts are found. Across the river in Illinois, very few hematite axes are found, while celts are comparatively plentiful and cones almost as numerous as plumb-bobs."

" As far as I have been able to observe or learn, the Indians neved mined hematite for use in making artifacts. They picked up pieces of suitable size and shape and worked each piece down to a single article for use. I do not think the Indians very often broke large pieces of hematite and made several things out of the small pieces. They usually found a piece of the right size to work it down into the desired object. I have numerous pieces from the crude nodule to the finished objects, showing the stages in making grooved axes, plummets, cones, celts, etc.

" The so-called hematite mine at Leslie, Franklin Co., Missouri, which was discovered a few years ago, proved to be a place where the Indians mined paint but not hematite. It is true that the Indians broke off some of the hematite in this mine, but that was in order to make room for work in quarrying the paint.

" The pieces of hematite found on the surface in Missouri, no doubt, were as easily worked as any that could be quarried or mined."

Doctor Whelpley explains how that he was able to make so large a collection of these implements by the fact that his medical and pharmaceutical friends have been very kind in assisting him in securing specimens and information.

The percentage of ornaments or problematical forms in his collection would seem abnormally high in any other exhibit. Hundreds of common forms of celts, plummets and other objects offered him he did not purchase, his series in these forms being practically complete.

He states that there are a number of hematite objects offered for sale, of recent manufacture, with intent to defraud. Hematites of recent manufacture appear fresh, are not patinated, and after much experience it is easy to distinguish them. I have not compiled a complete table of his collection for the reason that he did not secure all the specimens offered him. Dr. Whelpley has a special collection for study and comparison of over one hundred fraudulent or mutilated specimens.

Axes — 487
Celts — 426
Plummets — 311
Paint Stones — 206
Cones — 147
Gorgets
Balls
Mauls
Pendants

Ceremonials
Bars
Pestles
Discs
Tubes
Bicaves
Pipes
Spears

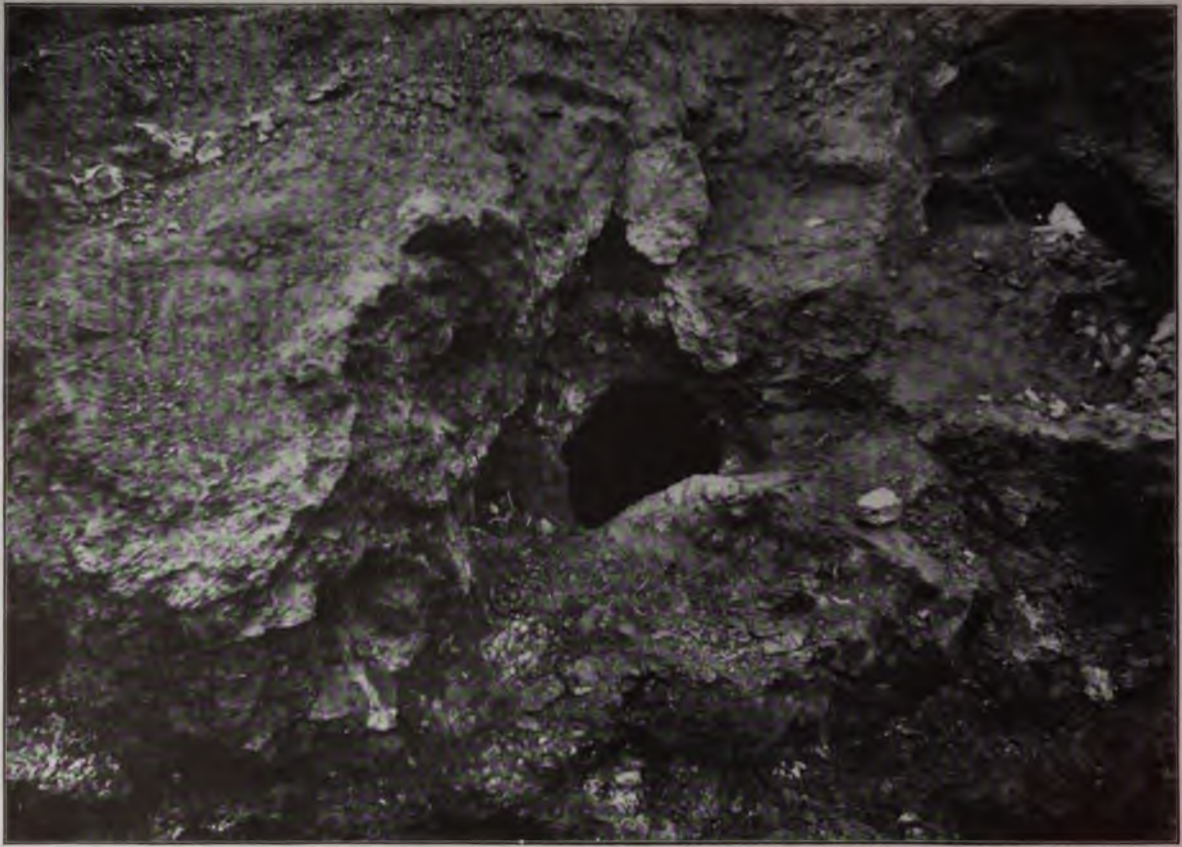

Fig. 18

Face of the ore body, showing sections of the ancient mine openings.

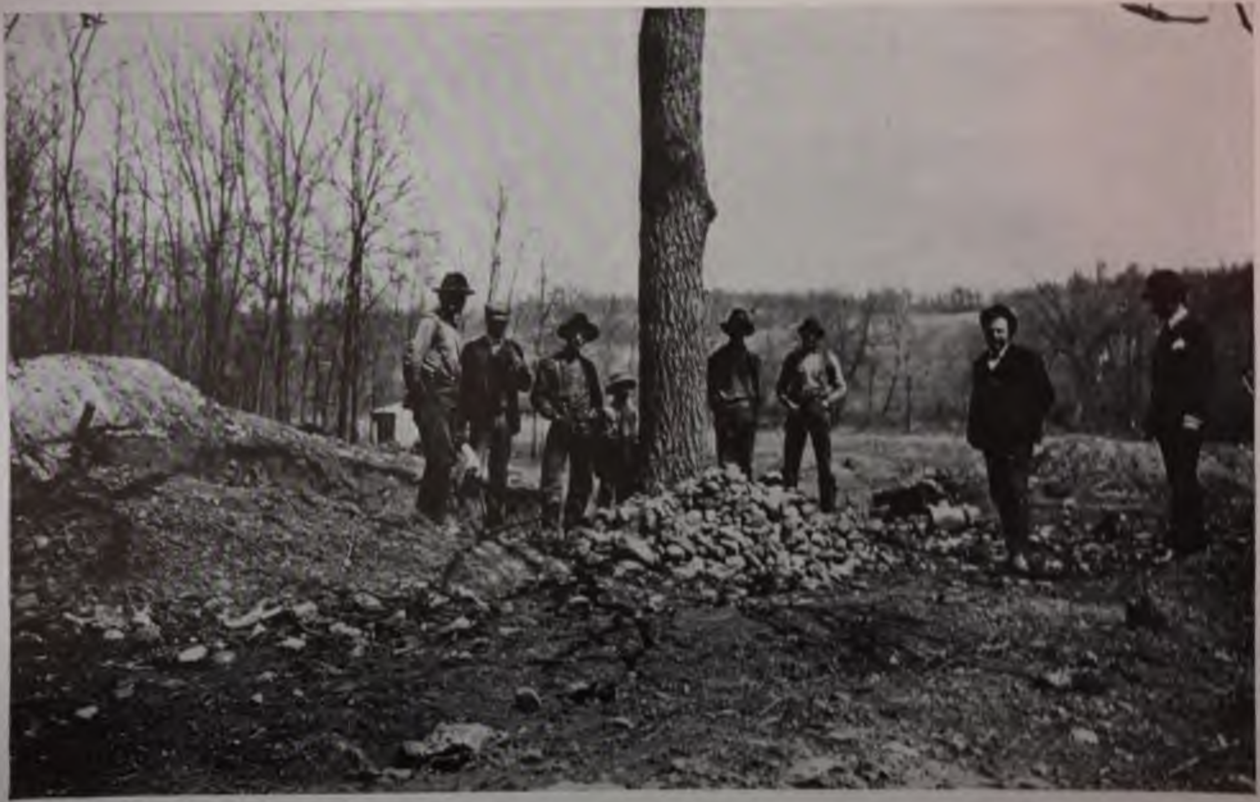

Fig. 19

Heap of stone sledge heads, about 1200 in number, collected on the margin of the mine.

MR. DOUGLASS' REFERENCE TO HEMATITE

"The collection now under consideration closes with a most extensive and varied series of objects in hematite and other iron ores. They number in all about eleven hundred specimens, of which about 1050 are in red hematite, and the balance in the brown hematite and other ores of iron. This is believed to be the largest single collection of hematite objects in the country, and shows conclusively the appreciation of the Indian for beauty of form and symmetry in proportion, and that he spared no labor in expressing this feeling in the hardest and most obdurate material. These specimens appear to radiate from three great centres, viz.: The subdivisions are, the natural nodules or 'Mineral Lumps,' the 'Paint Lumps,' whose surfaces show evidences of rubbing to obtain the paint so common among the tribes from Florida to the north and west; 'Balls and Hammer Stones,' shapes worked from the most obdurate ore; 'Grooved Axes,' from an ounce to eight pounds in weight, the largest being exquisitely polished; 'Celts and Cutters,' from half an inch to seven inches in length; 'Grooved Plummets and Sinkers'; a large number of 'Burnishers' of very varied shapes, and 'Pear-shaped Pendants,' finely proportioned, which may have been ornaments and yet possibly weights for weaving." *

So far as I can judge by correspondence and examination, the hematite collections arranged according to numbers or size in this country are as follows:

Doctor Whelpley's, that of the Smithsonian Institution, A. E. Douglas' exhibit and American Museum of Natural History, Ohio State Archaeological Society, Phillips Academy, Andover, Missouri Historical Society, Mr. H. M. Braun, East St. Louis, Illinois, Field Museum of Natural History.

There are smaller but important exhibits in the Peabody Museum, Harvard, the Canadian Museum at Ottawa, and elsewhere.

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* Bulletin American Museum of Natural History, No. 8, 1896.

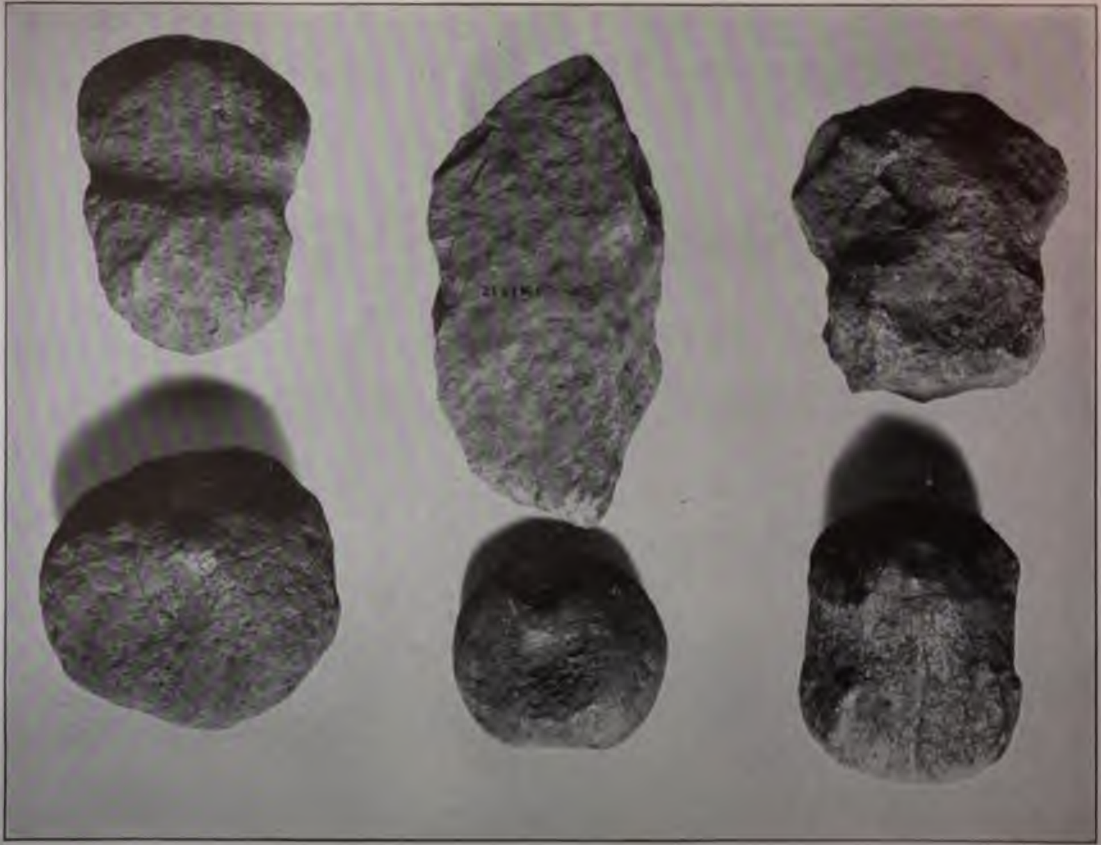

FIG. 20

Stone sledge heads, hammers, and rude pick from the ancient galleries. One-third actual size.

Professor William C. Mills, Curator of the museum of the Ohio State Archaeological and Historical Society and the Ohio State University at Columbus, was kind enough to furnish me classification of hematites in his museum. Professor Mills writes as follows:

COLUMBUS, November 3, 1911

"I have your letter of the 30th ult., and I am very happy to comply with your wishes in sending you the number of hematite objects that are on exhibition in the museum. (The number that I give you is not the exact number we have, but only those that are on exhibition). I have estimated the number not on exhibition at about one hundred and twenty-five specimens and those on exhibition three hundred and eighty-one, making a total of something like five hundred specimens of hematite in our museum.

"I took occasion this morning to make an inventory of every case in the museum and I am sending you the results as follows: cones, sixty-one; plummets, eighty-nine; ornaments, six; axes, eight; celts, one hundred and eighty-six; pipes, two; pestle, one, and rubbing stones, twenty-eight. The dark red hematite predominates.

"I have no record of any caches of hematite. I have never found but one hematite piece in a mound and that was a beautiful cone found in a mound at Jackson. All others have been surface finds. The two pipes mentioned are from the Adams collection and are certainly very unique. Practically all of the finds are from the village sites in southern Ohio. I feel that our museum is very short of hematites, compared with our resources. I understand that Dr. Whelpley of St. Louis has perhaps the largest collection of hematites in the world, although the region around St. Louis is specially rich in hematite. We have a good Ohio field and we ought to have a very fine collection of these objects."

WM. C. MILLS

Squier and Davis, in their extensive explorations among the tumuli of Ohio refer to and illustrate hematite objects along with plummets of other materials.

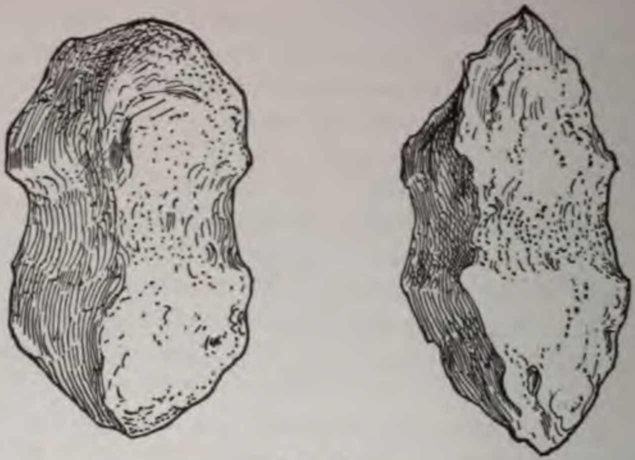

FIG. 21.

Sketches of the rudely shaped mining implements.
(See page 63)

They found hematite plummets and celts near the mounds, but not in them. Nor were other plummets to be found in the tumuli.

Referring to the statement by Lawson, in Lawson's Carolina, p. 193: — "Some of the Indians wear great bobs in their ears." Squier and Davis say:—

"We have discovered none of these ornaments in the mounds, and it is difficult to say whether or not they are genuine relics of the mound-builders. It is possible they were used both by the earlier and later races. In the Museum of the East India Society at Salem, Mass., are a number of articles of similar character, which were found while making excavations in that city. They are larger and of much ruder workmanship than those of Ohio, but of the same shape, and grooved in like manner. It has been suggested that those of hematite, which are most numerous, were carried about the person for the purpose of supplying an ornamental paint. Rubbed upon any sharp grit with water, they furnish a dull red pigment,— much inferior, however, to the French preparations for the toilette. Irregular fragments of the same material are sometimes found bearing the marks of frequent trituration. Such may have been the secondary use of some of these articles; the frequent occurrence of those made from other materials establishes that they were primarily designed for other purposes." *

Mr. John W. Wright of Knoxville, Iowa, reports over twenty hematites, all but one of which were found near Knoxville. Eleven are celts, two are axes, one an ornament.

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* Ancient Monuments of the Mississippi Valley, p. 235.

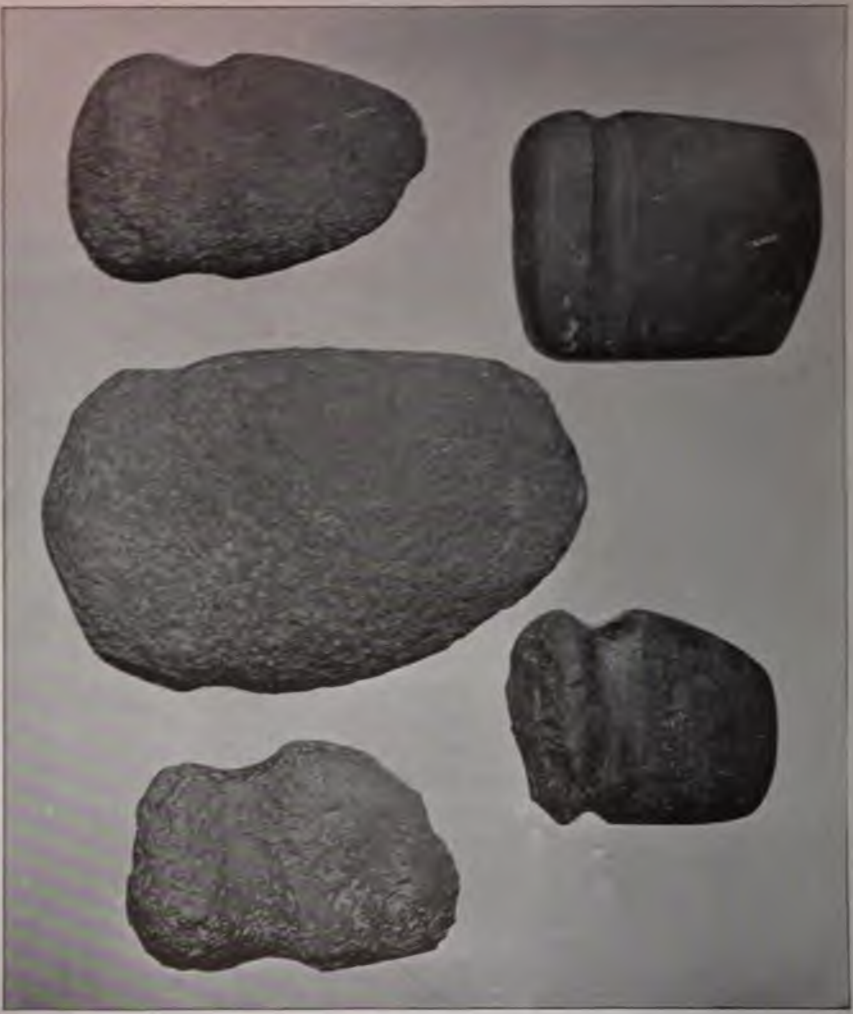

FIG. 22. S. 2-5. ANDOVER COLLECTION

Hematite axes. All from Missouri except one from Ohio. The largest axe is unfinished.

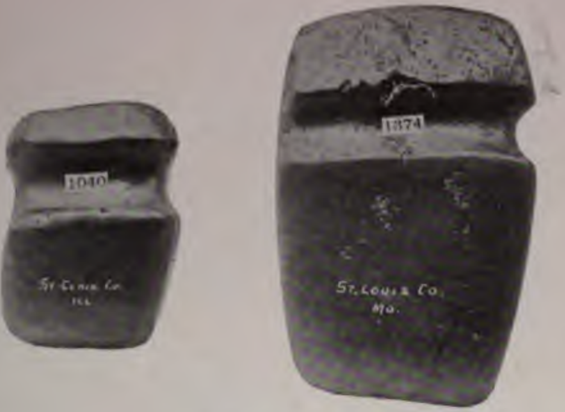

Fig. 23. S. 1-2

Two of the best grooved axes I have ever seen are shown in this figure, from the collection of Mr. Braun, East St. Louis, Illinois. There is one in the National Museum, and one in the New York Museum, each of which weighs over ten pounds, and they are nearly as symmetrical as Mr. Braun's largest one. Dr. Whelpley reports having a beautiful and symmetrical axe from Calhoun Co., Illinois. It is made of hard steel blue hematite and weighs just twelve pounds. See illustration on page 99.

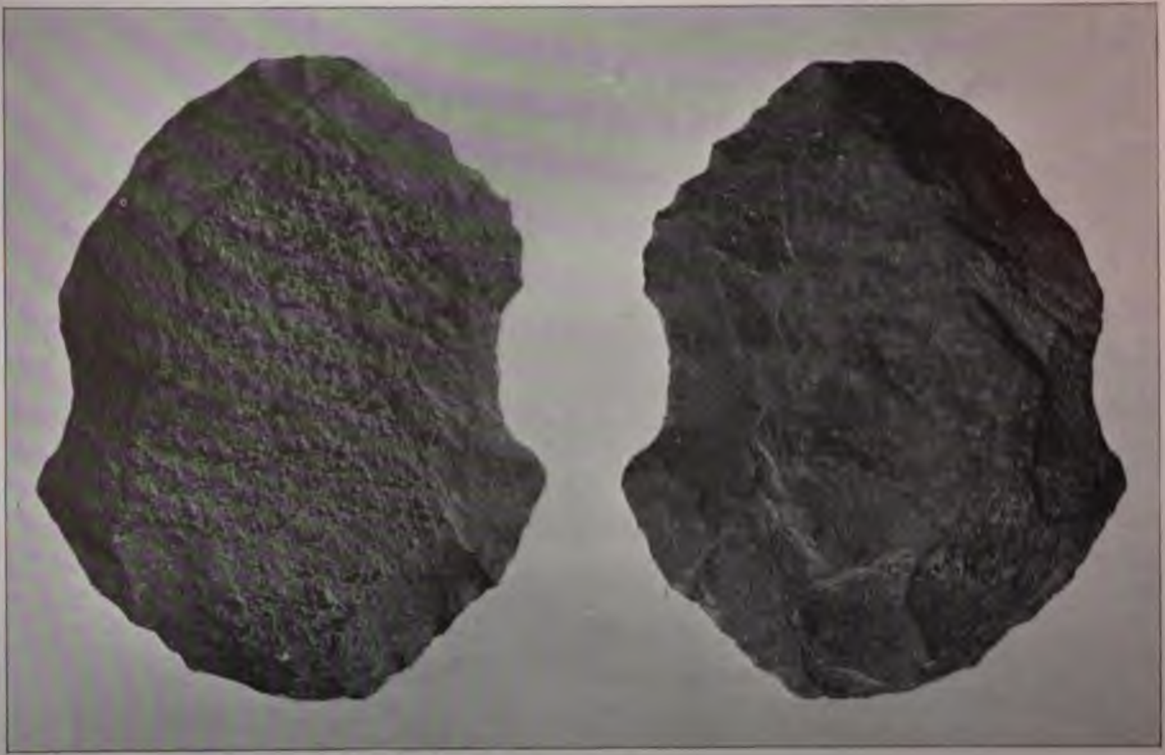

FIG. 24. S. 7-8. ANDOVER COLLECTION

Peculiar notched hematite object found by Mr. E. S. Byington near Dierks, Arkansas. An unusual type. Not pure hematite, but the stone of which it is composed carries a percentage of iron. Both sides are shown.

CHARACTER OF THE IRON ORE

There are several varieties of hematite. And the implements of one section of the country exhibit varying degrees of hardness and variations in color. The percentage of iron also varies. In order to determine these differences accurately, I asked Mr. James C. Graham, head of our Department of Science at Andover, to make me an analysis, as accurate as possible, in his chemical and physical laboratory. Mr. Graham kindly acceded to my request and spent some two weeks in preparing a report based upon careful analyses of some fifteen or twenty fragments of hematite submitted. All of these are broken implements or fragments of hematite which the Indians had not completed into finished forms. Mr. Graham's report here follows.

GENERAL REPORT AS TO ANALYSIS

The specimens submitted for examination vary greatly as to composition, hardness and specific gravity.

Specific Gravity

The specific gravity was determined of the specimen as a whole without regard to its porosity and the included air. This specific gravity would correspond to that of the implement made of such material by the Indians, (which I presume is the point in which you are interested) rather than to the actual specific gravity of the solid matter.

Hardness

The hardness varies greatly even in the same specimen owing to the difference in the compactness of the materials. In some cases this has been indicated by the range of hardnesses given. When only one hardness is mentioned, it indicates a fair degree of uniformity.

Composition

In general the composition is ferric oxide (Fe_2O_3) mixed with more or less silica (SiO_2). The mixture is usually so intimate that after the solution of the iron in acid, a skeleton of the silica of the original form of the specimen remains. In

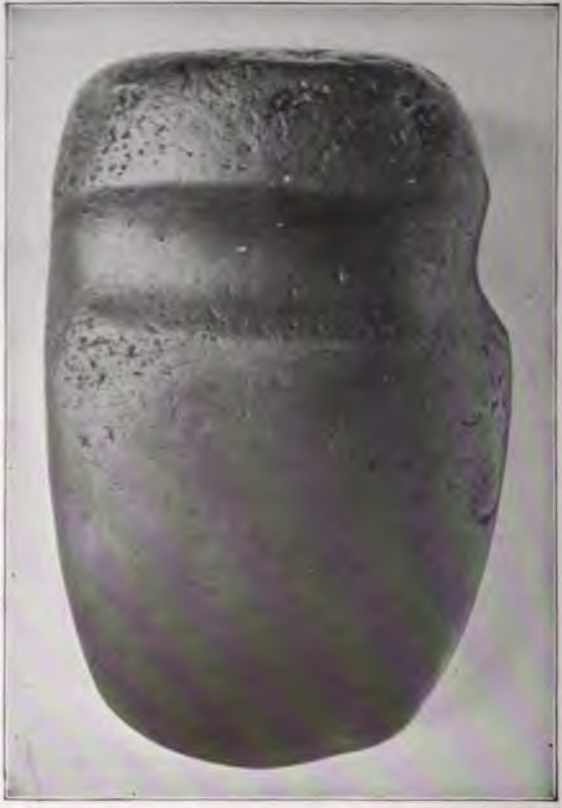

FIG. 25. S. 5-7

A beautiful hematite axe from the collection of Henry M. helpley, St. Louis, Missouri. This was found in central Missouri.

nearly all cases there is a slight amount of water present, though the amounts "combined" and "uncombined" were not determined separately. In the specimens from Union County, Illinois, there seems to be a considerable amount of magnesium (largely as carbonate) especially in the black specimen. This specimen is banded, evidently a vein deposit, and the layers between the bands of hematite were probably largely magnesium carbonate. Probably some of the iron is also in the form of siderite, ferrous carbonate, ($Fe CO_3$). The amount of magnesium was not determined. It might be between five and ten per cent. I could find no trace of calcium compounds in this specimen.

In the red hematite from Union County, there are large pieces of agate-like quartz, in some cases more than a cubic centimeter in size. The specimen analyzed contained no amygdaloids of any visible size; but even in this specimen the percentage of silica is very high.

JAMES C. GRAHAM

Jan'y 3rd, 1912.

The chemical analyses are herewith submitted. The specimens numbered are from the Andover collection. The localities as follows — 45449, Missouri; 45749, Ohio; 29774, Missouri; 12890, Ohio. The other two specimens presenting the black and red hematite are from Doctor Whelpley's collection.

SPECIMEN 45449, FROM MISSOURI

Black Hematite, somewhat crystaline

Ferric oxide	98	per cent
Insoluble residue, mostly silicious	1.5	" "
Hardness	5.5	
Specific Gravity	5	

SPECIMEN 45749, FROM OHIO

Red Hematite, fine grained

Ferric oxide	90.4	per cent
Insoluble residue, mostly silicious	7.4	" "
Water, free and combined	1.5	" "
Hardness (varies)	3-5	
Specific Gravity	4.49	

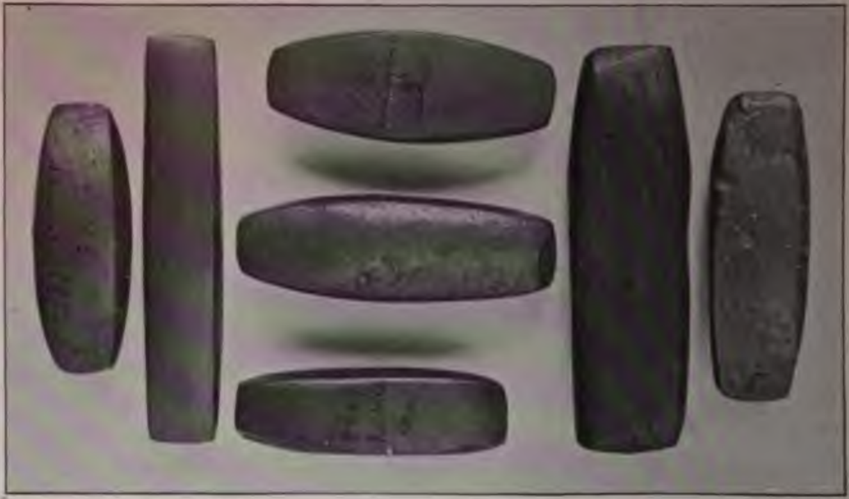

FIG. 26. S. 5-9. H. M. WHELPLEY COLLECTION

Hematite bars. Rare. All but the second from the left are made of very hard black hematite. This one has a shell .06 inch thick of reddish brown, hard hematite covering, and core of yellow ochre. Three are from Missouri, three from Ohio and one from Tennessee. There are numbers of stone implements in the same peculiar form. All of these are highly polished and their use must remain, for the present at least, entirely theoretical. In this collection are other hematite bars not as well finished, and several broken ones.

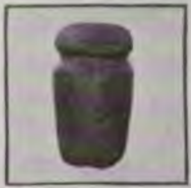

FIG. 27. S. 15-16. H. M. WHELPLEY COLLECTION

The smallest hematite axe known. It is made of very hard black hematite and was found near De Soto, Jefferson County, Missouri, in an old cultivated field, by J. C. Bowman, in 1893.

SPECIMEN 29774, FROM MISSOURI

Black Hematite

Granular

Ferric oxide	98.2	per cent
Insoluble residue, mostly silicious	.65	" "
Water, free and combined	1.	" "
Hardness	6	
Specific Gravity	4.86	

SPECIMEN 45750, FROM OHIO

Dark red, fine grained Hematite

Ferric oxide	86.4	per cent
Insoluble residue, mostly silicious	11.2	" "
Water, free and combined	2.	" "
Hardness	5-6	
Specific Gravity	3.84	

SPECIMEN 12890, FROM OHIO

Fine grained red Hematite

Ferric oxide	82.6	per cent
Insoluble residue, mostly silicious	13.9	" "
Water, free and combined	3.	" "
Hardness	4	
Specific Gravity	3.65	

UNION COUNTY, ILLINOIS, SPECIMEN (Whelpley)

Black Hematite, partly crystaline

Ferric oxide	84.7	per cent
Insoluble residue, mostly silicious	2.5	" "
Water, magnesia	12.	" "
Hardness	5.5	
Specific Gravity	3.64	

UNION COUNTY, ILLINOIS, SPECIMEN (Whelpley)

Fine grained red Hematite, including much quartz

Ferric oxide	51.6	per cent
Insoluble residue, mostly silicious	42.1	" "
Water and traces of other compounds	6.	" "
Hardness	4.5	
Specific Gravity	2.97	

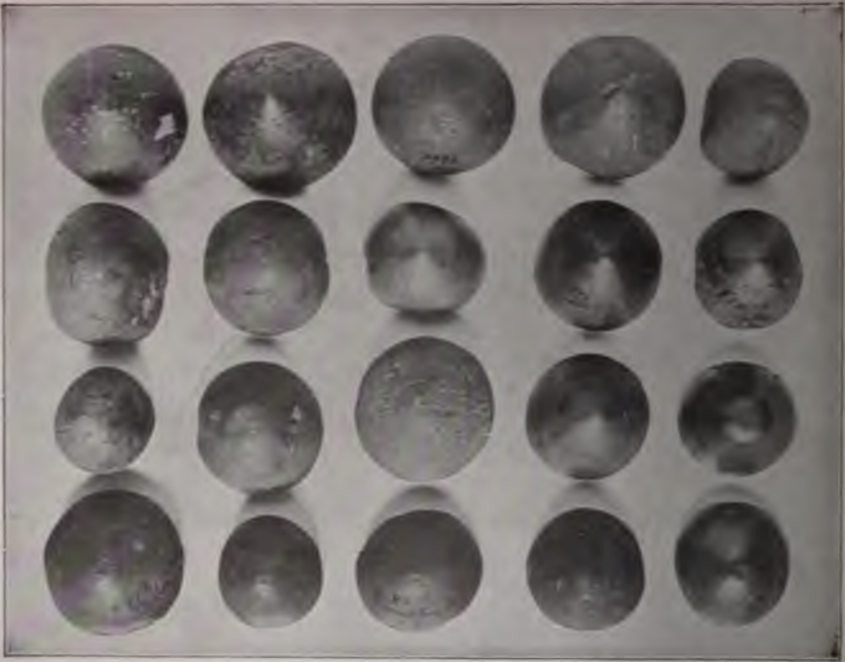

FIG. 28. S. 1-2. H. M. WHELPLEY COLLECTION

Hematite cones. Same form as 8 and 9 of Fig. 2. From Illinois, Missouri, and Arkansas.

THE SOURCES OF HEMATITE

The Handbook of American Indians refers to the fact that most of the hematite made use of by the prehistoric peoples was found on the surface. Doctor Whelpley is of this opinion and I agree with these and other observers. There is no evidence, up to the present, that the Indians mined hematite as they did flint or copper. But they did mine a softer hematite and oxides in order to obtain paint. Iron ore of various kinds occurs generally in the United States and it was no more than natural that the aborigine should pick up various bits of ore that he saw during his travels.

The discovery by Dr. Cox of an Indian paint mine is of great interest. Whether other equally large deposits of hematite were worked to obtain paint, I do not know, although it is quite likely that the Indians visited all the available hematite veins or iron outcrops and procured the valued pigments wherever possible. A tremendous amount of work was done on the estate of Dr. Cox. I say tremendous, advisedly, for it must be borne in mind that it was necessary for the Indians to break through the various layers of stone, remove exceedingly hard bodies of ore by means of very primitive and ineffective tools. Mining by means of a hand drill and black powder is considered laborious and difficult at the present time, much more tedious than the use of the compressed air drill, dynamite and modern machinery. Yet these enterprising aborigines had no tools save rudely notched stone hammers and hammers made of the harder fragments of hematite. That they were able to excavate a considerable number of tunnels and pits in a ridge composed chiefly of iron ore, is remarkable, to say the least.

This paint mine opened by Dr. Cox is set forth by Prof. W. H. Holmes in the Smithsonian Report for 1903. The article should be reproduced here, and Professor Holmes was kind enough to grant permission.

TRACES OF ABORIGINAL OPERATIONS IN AN IRON MINE NEAR LESLIE, MO.

By W. H. Holmes

Early in April, 1903, a communication was received by the Bureau of American Ethnology from Dr. S. W. Cox, of Cuba, Mo., stating that evidences of ancient mining operations had been discovered in an iron mine operated by him near Leslie, Franklin County. This report was confirmed by Mr. D. I. Bushnell and other St. Louis archaeologists, and the present writer, who is especially interested in the quarrying and mining industries of the aborigines, repaired at once to Leslie to make a study of the interesting phenomena.

It was found that the miners had encountered a body of iron ore, of unknown depth and horizontal extent, lying immediately beneath the surface of the soil on a gentle slope reaching down to the banks of the Big Creek, a branch of Bourbois River, and that they had removed the ore from a space about 100 feet wide, 150 feet long, and to a depth of from one to five feet, and as the work progressed it was found that the ore had been fairly honeycombed by the ancient people, the passageways extending even below the present floor of the mine, as at the right of the figure in the plate. There were many partially filled galleries, generally narrow and sinuous, but now and then larger openings appeared, two of these being of sufficient dimensions to accommodate standing workmen.

In the debris of the old excavations many rude stone implements were encountered, and upward of 1,000 of these had been gathered by the miners into a heap on the margin of the mine. (See Fig. 19). These sledges are exceedingly rude, consisting of hard masses of stone or hematite weighing from one to five pounds, and roughly grooved or notched from the attachment withe handles, no trace of the latter remaining, however. The great number of these implements made it certain that extensive operations had been carried on by the ancients, but the exact nature of the work was not readily determinable. The first impression was that the compact masses of hematite were sought for the purpose of manufacturing implements such as were employed by the mound-building tribes in many parts of the Mississippi Valley, but examination revealed few traces of the shaping of this material, save that it had been used in making the rude sledge heads or hammers found in the mine. In breaking up the ore the white miners encountered small, irregular seams and masses of flint, but these were too limited in extent and too brittle in texture to have been utilized successfully in the manufacture of implements. Some workable flint was observed in the vicinity of the ore body, and flakes and rejectage of blade-making, as well as a number of well-finished spearheads, arrow points, and leaf-shaped blades were intermingled in the filling of some of the superficial pits, but this flint-shaping appears to have been an incident only of the work on the site. The evidences of this shaping work are not sufficient to warrant the conclusion that the extensive tunneling was carried on for the purpose of obtaining material for that purpose. Besides, this flint is found in large bodies in many sections of the general region and could readily have been obtained in quantity by the Indians.

It was observed, in approaching the mine, that the exposed surfaces of the ore and the ground about were everywhere a brilliant red. The workmen were red from head to foot, and anyone venturing to handle the ore soon found his hands smeared with red oxide, repeated washing being required to remove it. The prevalence of the red color suggested at once the idea that the site had been an aboriginal paint mine and that the red and yellow oxides were mined and carried away to be used as paint — an article of utmost importance in the aboriginal economy.

As the charges of dynamite used by the miners broke down the walls of the mine it was observed that the deposits were of irregular hardness, that certain portions of the ore were very compact and flinty, containing much quartz, and of dark-bluish or purplish hue, while the larger part was so highly oxidized as to be easily broken up. Extending through the ore body in all directions were pockets and seams of soft red and yellow oxides, and in places there were irregular openings and partially filled cavities. Two of these openings are shown in Fig. 18, a view

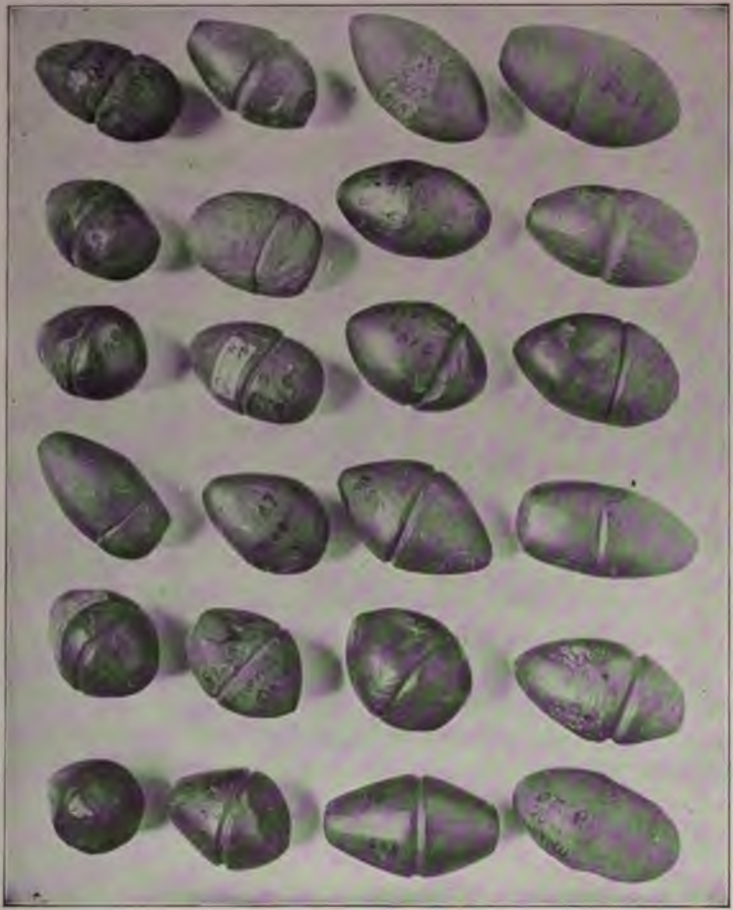

Fig. 30. S. 1-2. H. M. WHELPLEY COLLECTION

Hematite plummets, grooved in the centre. Nearly all are from Ohio.

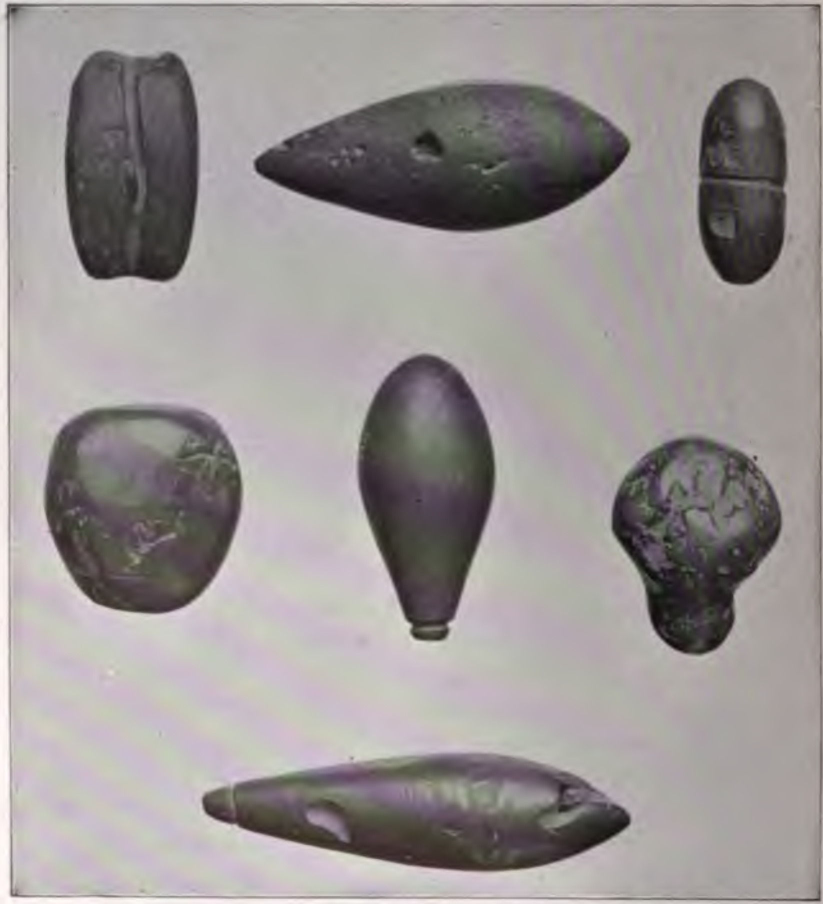

FIG. 31. S. 1-2

These objects are all from the Andover collection and show the various types of plummets. In the center is a fine plummet of steel gray hematite, very hard. Beneath it, a hematite a trifle softer in which there are some flaws. At the top, an unfinished hematite pecked and ground into shape, but not polished or grooved. On either side of the center, ruder hematite plummets, and at the top, to the left, a grooved hematite object, the groove extending around the longest periphery of the object. To the right is a small plummet, grooved in the centre.

of the face of the mine taken by Mr. Clark McAdams, of St. Louis. The miners would drill with great difficulty through the hardest of ore, to have the drill drop suddenly into a cavity of unknown depth. This occurred at the spot shown in Fig. 16. It was difficult to discover just which of these openings and cavities were artificial, or whether or not they had been penetrated by the ancient workers, as changes are constantly taking place in such ore bodies. Percolating waters fill up or clear out the passageways. Generally, however, as the walls were broken down by our miners the openings were found to connect with the superficial pittings, as indicated in Fig. 17.

It appears certain that the larger tunnels or galleries in which the sledges were found had been opened up or enlarged by the ancient miners and that, in the search of other bodies of the desired product, they had followed weak lines and partially filled passageways, removing the projecting masses of hard ore, where these interfered with the work, by means of the sledges. Sketches of these rude implements are shown in Fig. 21, and the specimens appear on Fig. 20. It is apparent that the sledges could have had no other function than that of crushing and breaking up the solid masses of ore to be used in the manufacture of implements or in opening new passageways through the ore body, (although these sledges were made in the main of compact bits of the ore and of numbers in the copper mines of Lake Superior). Nearly all appear to have been hafted for use, and the majority show the rude grooving or notching necessary for the attachment of the withe haft. It would seem that in the narrow passages of the mine the use of hafted implements would be inconvenient if not entirely impracticable, and we are left to marvel at the feat accomplished by the ancient workmen of penetrating a compact ore body in dark, sinuous passages hardly roomy enough to admit the body of a man, with the aid of rude bits of stone held in the hand. The character of these openings is indicated clearly in Fig. 18, which shows the face of the mine as freshly exposed by the mining operations; and Fig. 17 indicated somewhat imperfectly the manner in which the tunnels or borings penetrate the ore body connecting with the superficial pits and extending to unknown depths beneath the present floor of the mine. Three of

are seen in the wall of the mine shown in Fig. 15.
ed at the right of the right-hand figure, and a second
d this, extending from the stump on the margin of
vn to and beneath the feet of the man whose back
e ard the observer, and a third passes down from the
se , being the same opening as that shown at *dd* in
17.

Numerous examples of the implements found and specimens of the ore in its various phases, together with a large mass of the compact ore, one surface of which shows the markings of the mining tools of the aborigines, were presented to the U. S. National Museum by the proprietor of the mine, Dr. S. W. Cox.

I have now examined mines and quarries of the aborigines in twelve distinct materials, and each new example has added to my former high estimate of the enterprise and perseverance of the native peoples when engaged in the pursuit of their normal industries.

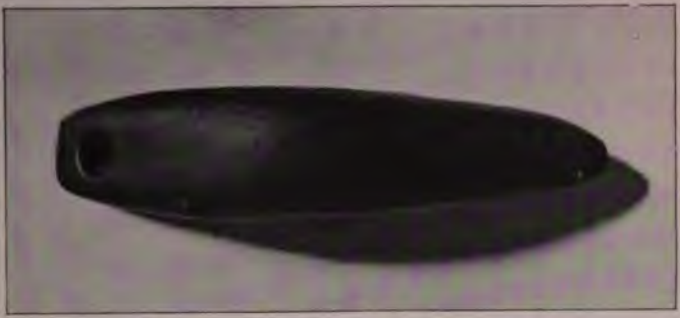

Fig. 32. S. 5-6. H. M. WHELPLEY COLLECTION

Rare type of perforated plummet. This is a type but as a rule the specimens are not so long but thicker. These objects seem to be peculiar to the St. Louis section of our country, extending up in Illinois beyond Alton. From Hancock County, Illinois.

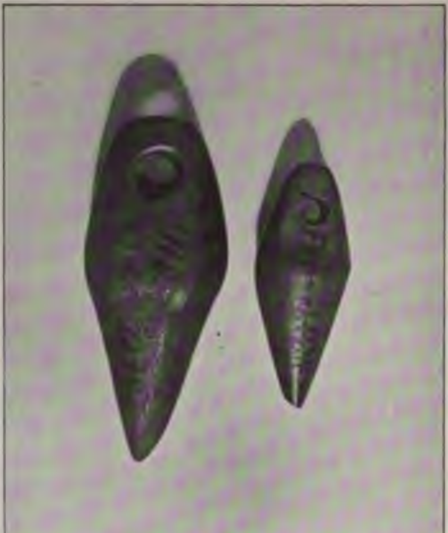

Fig. 33. S. 6-7. H. M. WHELPLEY COLLECTION

Two rare perforated plummets. These were plowed up together near French Village, a few miles south of East St. Louis, Illinois. These do not constitute a type in hematite, although similar ones of stone have been found.

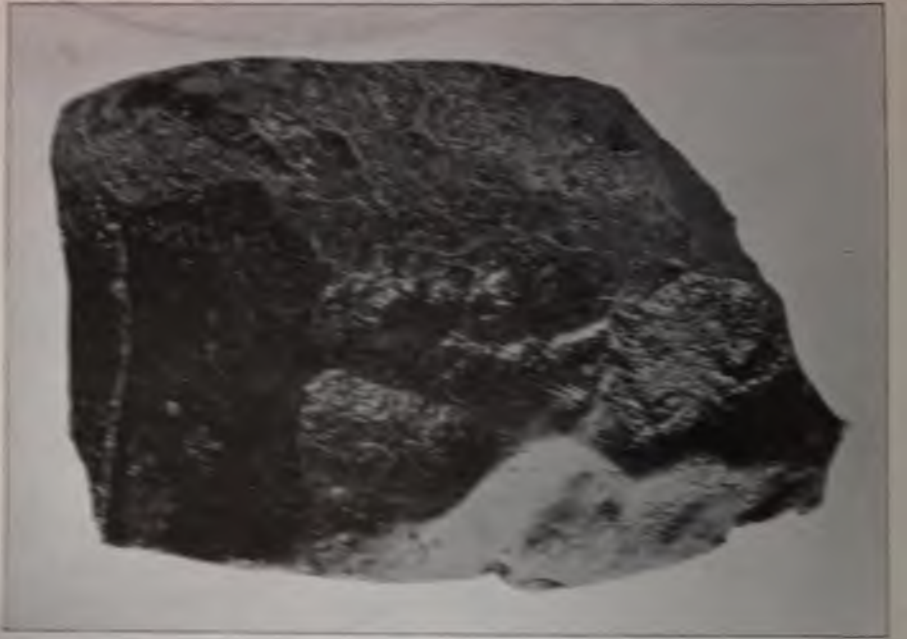

FIG. 98. S. 34. H. M. WHELPLEY COLLECTION

Crude piece of hard, black Missouri hematite. This specimen is 3½ inches thick. The surface is highly polished. It was found in Johnson County, Missouri, together with some very fine, large hematite celts. It is an example of the natural pieces from which celts are made.

A STUDY OF THE OBJECTS

A study of specimens themselves leads one to conclude that the greatest amount of work was put upon the specimens of the finest iron ore independent of their hardness. That is, a specimen because of its lustre, or color, appealed to the Indian and he laboriously worked it out into the desired form. Hardness is a factor to be taken into consideration, for the axes are invariably made of the harder hematite. Usually the finest plummets are of the steel gray or black or very dark red hematite. Mr. Clarence B. Moore sent me a drawing of a most beautiful plummet, graceful and tapering and a trifle over 3 1-2 inches in length which was plowed up near Marksville, Avoyelles Parish, Louisiana. It is of the elongated pear-shape type, similar to one shown in figure 31.

The hematites of Ohio and West Virginia for the most part are somewhat softer than those of Missouri and Illinois. Outside of the heart of the hematite belt only the finer specimens seem to have penetrated. The hematite plummet, or celt in the South or extreme North or West, is usually a fine specimen and was doubtless much prized. But in Ohio, West Virginia, northern Kentucky, Missouri and Illinois there are multitudes of small hematite celts, many unfinished hematite pieces and chunks of hematite so rudely fashioned that we cannot classify them. Whether such crude objects resisted the attempt of the prehistoric artizan or were the product of unskilled workmen is a question. Many such are, doubtless, paint stones. Undoubtedly much of the hematite was too hard for him to work satisfactorily, and he cast it aside just as he cast aside flint or argillite or quartz when he discovered either flaws or exceedingly hard and refractory sections in the stone.

Mr. Douglas has referred to the presence of paint hematite generally in the United States. It seems to me that we should recognize the difference between ordinary soft hematite, or oxides of iron, which the natives regarded of value because from them they obtained paint, and the true hematite. Next to the celts, described on page 71, we have the large class of plummet-shaped objects and the hemispheres and cones. The axes may be con-

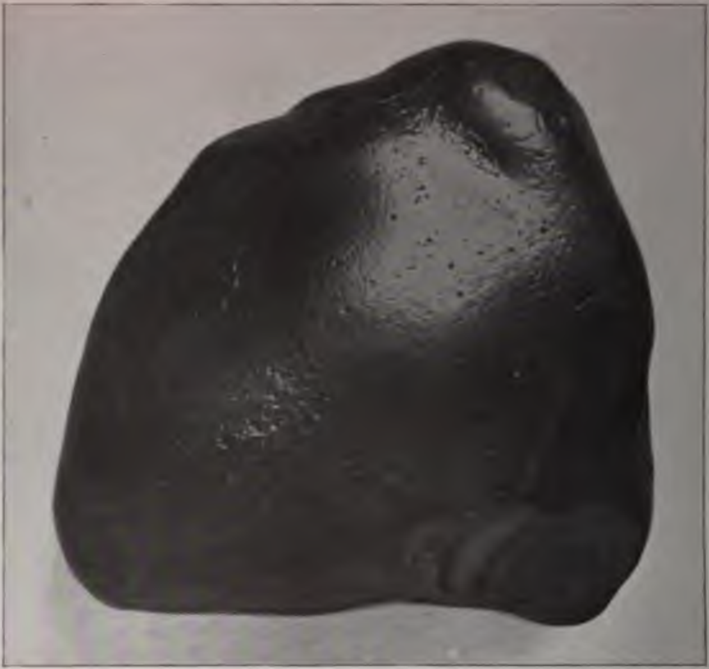

FIG. 35. S. 6-11. H. M. WHELPLEY COLLECTION

Crude Hematite. This is a very peculiar piece of high grade ore, wonderfully polished, found by a pearl fisherman in the Illinois river near Ottawa, Illinois.

sidered to occupy a limited area, the center of which is not far north or northwest from St. Louis, Mo.

One of the surprising things to me with reference to hematites is that they do not seem to have been objects of commerce to the extent of sea-shells, copper and mica. The Florida and Carolina tribes seemed to have sent large numbers of sea-shells into the Ohio valley. It would appear that copper was carried from the Great Lakes region into the far South — that is, supposing that copper in use along the gulf and southern Atlantic seaboard was not obtained from local sources. But hematite south of Tennessee is quite rare and it is not at all common in the Great Lakes region, Pennsylvania, or New York. Yet it was thought to be valuable for the reason that the few hematite objects found in the South, or the East, or outside of the localities where iron ore was obtained, are always of the finest workmanship.

We must consider the grooved axes as local; the tablets, ornaments and winged forms as local. The other forms are more or less widespread, but not general, and the celt and the rubbing stone alone as very widely distributed through the entire hematite belt.

The triangular pieces of hematite, the irregular fragments which show evidence of working are general throughout the Ohio valley and it cannot be said that they are more numerous in Missouri than in West Virginia.

The few hematite discoidals, or bicaves, and the one or two hematite ornaments found in the Ohio valley may have been imported from Missouri where greater numbers occur, but I think that they are local and independent of any influence on the part of the Missouri artizans.

Why more hematite plummets, hemispheres and cones are not found with skeletons in the Ohio valley must remain an enigma, unless the suggestion is true that the use of hematite in the Ohio valley preceeded the building of mounds and the making of stone graves. This opens a new and interesting line of thought.

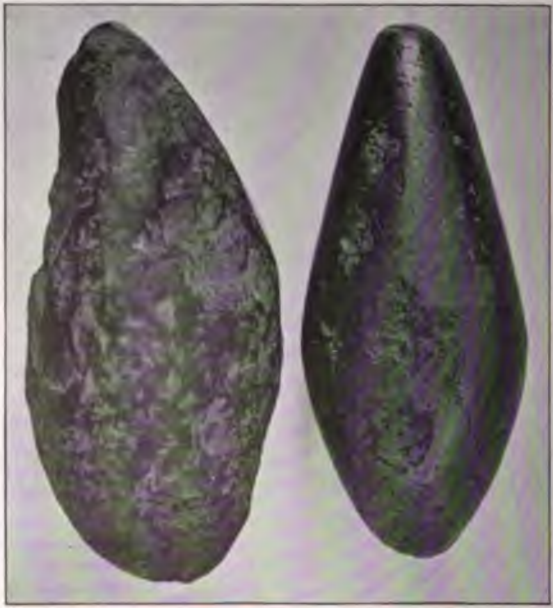

FIG. 36. S. 7-9. H. M. WHELPLEY COLLECTION

Unfinished hematite plummets in the rough, showing two stages in process of manufacture from nodule or chunk of ore to the finished object; made from hard, black Missouri hematite. In this collection can be found a dozen specimens showing each stage from the untouched chunk of ore to the highly polished and finished plummet.

THE CELTS

From the very nature of hematite, it being heavy, large objects in this material would not be expected. And it is true that the natives did not work large fragments of the ore. That is, they may have broken up large pieces, but none of the grooved axes or celts are to be compared in size with similar stone tools common in the Ohio valley.

The classification of celts, found upon page 19, gives one a fair idea of the range of these implements, which is considerable.

Not only are they oval with sloping faces, but also they are flat, they are beveled, and in some of them one side is flat and the other convex. The edge may be straight, or curved or sloping. The top or poll pointed, rounded, square or angular. They pass through quite as extensive a range in form as do the stone celts, yet, I have never seen a large hematite celt. Dr. Whelpley has a few larger than those on exhibition in most museums, but these are strays and do not establish a type and they are not large in the sense that stone celts are large. Few celts are over four inches in length. I never heard of one eight inches long.

Quite likely, as Professor Holmes has indicated in his article in the Handbook of American Indians, small celts served as amulets and charms, or were part of the shaman's outfit. To people knowing nothing beyond stone-age culture even the red or brown iron-ore celts must have been objects of veneration.

The very small celts — one half to one and a half inches in length — may have belonged to the "problematical" class referred to above. It is difficult to assign them a purpose as utility tools of the ordinary sort.

The uses of the celts are probably similar to uses of the small polished stone hatchets. They are of convenient size to be mounted in wooden or bone handles and employed to dress skins and hides. Those three to four inches long might have served as small war hatchets, for properly mounted they would form weapons not to be despised. The edge of the iron-ore celt is harder, and it seems to me less liable to become chipped or broken, and susceptible of greater keenness, when ground. Dr.

Whelpley thinks that the edge of hematite celts was more liable to chip. Hematite blades might have been inserted in the more prized war-hatchets. We cannot conceive that hematite celts always played a menial part. In fact, it is my opinion that they were considered above the average celt of ordinary rocks, and even of hard materials such as granite or greenstone.

The surprising number of very small and highly polished celts indicates that these were used until the object was worn down to exceedingly small proportions. How that this wearing is observed to be symmetrical — all proportions being reduced equally — is indication that great care was exercised in the use, or the care, or the refashioning of the implement. No such care is to be observed in the treatment of stone axes or celts of ordinary materials. They may be worn until the blade is greatly shortened, and the top or poll is out of all proportion to the edge. Dr. Whelpley thinks the fine, very small celts were "born" small. He has studied a number of them and refers to those from one-half to one inch long.

NOTE.— Since writing this article on celts, Dr. Whelpley reports that he has a few celts about six inches long.

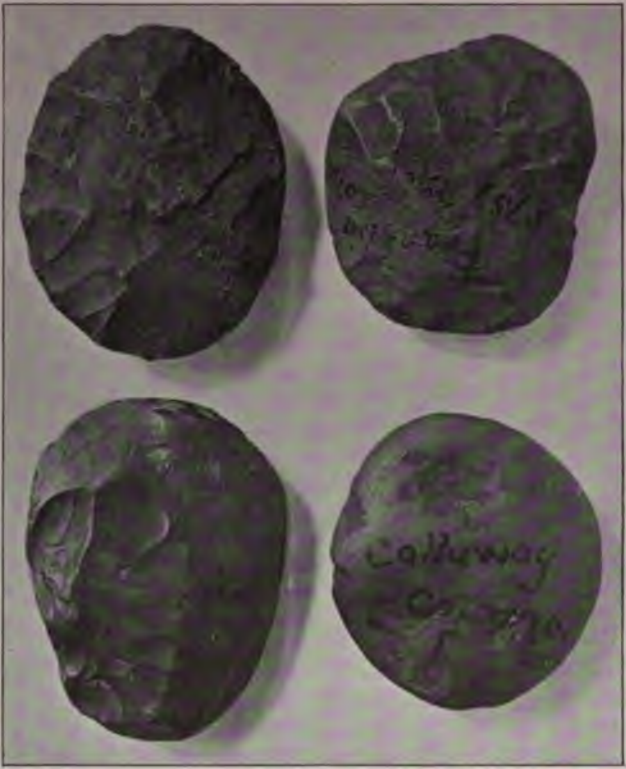

FIG. 37. S. 3-4. H. M. WHELPLEY COLLECTION

Rare chipped hematite discs of hard black hematite. Upper discs from Callaway and Franklin Counties, Missouri, lower ones from Virginia and Callaway Counties, Missouri. Their purpose is unknown. They resemble the flint discs of Tennessee. The one in the lower right-hand corner has been ground.

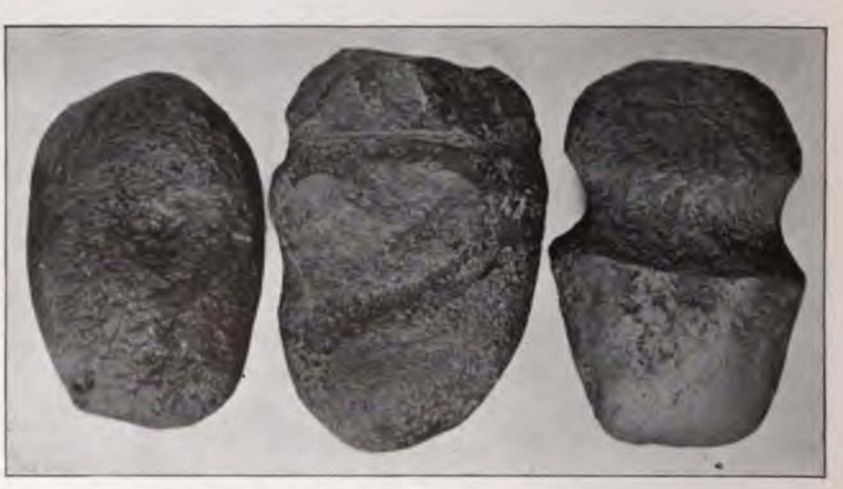

FIG. 38. S. 1-2. H. M. WHELPLEY COLLECTION

Three stages of manufacture, from the pecked nodule to the finished hematite axe, are shown in this figure. The material is hard, black hematite. The central object shows attempt at cutting the groove. Doctor Whelpley has in his collection a series of a dozen pieces extending from the untouched hematite nodule through the broken, chipped, pecked, ground and polished stages to the finished axe.

THE PLUMMET AND ALLIED FORMS*

There are many of these. Some are grooved at the top, others about one-third of the distance from the top, and some there are which are grooved around the center. Plummets for the most part are rounded, but ones flat on one side are not unknown.

After much study of plummets finished and unfinished, I am not prepared to offer an explanation for their use. The general theory that they were suspended by means of a string tied around the groove, and worn as charms, etc., may or may not be correct. It does not appeal to me. Theoretically, I consider the groove too shallow or narrow to admit of securing them safely by means of a string — that is, if worn. Because of the weight of the object, and its highly polished surface, and its roundness, it would swing back and forth and be rather unsatisfactory as a suspended ornament. That the groove was for some special purpose, no one will deny. Perhaps the groove was not intended that the plummet might be suspended, but that something might be tied to the object — or vice versa.

Great care was manifested in working these hard iron-ore fragments into tapering plummets. It was not as easy task. What special significance the plummets carry, we do not know. Cones and celts and bits of paint are found with the burials, but the plummets in graves or mounds are exceedingly rare.

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* A paper on plummets in general was written by Dr. Charles Peabody, and published in the University of Pennsylvania Bulletin, Series, 1901.

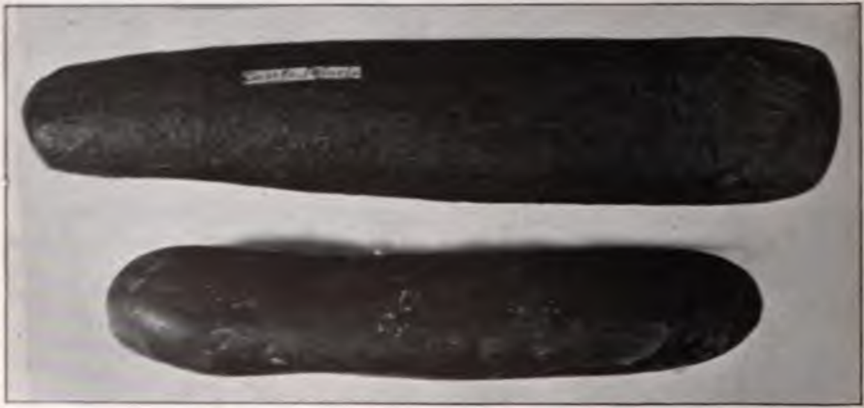

FIG. 39. S. 1-3. H. M. WHELPLEY COLLECTION

Very rare hematite roller pestles. These are rare in Missouri in ordinary stone. That they should have been made of hematite seems surprising. Possibly they were for use in preparing sacred meal to be used in the ceremonies. Both specimens show great age. Doctor Whelpley has another similar hematite pestle found in Michigan.

CONES AND HEMISPHERES

Professor Holmes wrote concerning these in the Handbook of American Indians, and I quote his remarks.

"HEMISPHERES, SPHERES. Small objects usually of polished stone, the use of which has not been fully determined; they are therefore classed with problematic objects. The more typical forms, found in the mounds, are often of hematite and, like the cones, rarely exceed a few ounces in weight. Hemispheres are comparatively numerous, but spheres referable to this group are rare. Hammerstones and stones used as club-heads (see Clubs, Hammers) are often spherical, but usually they are not well finished, and occasionally large cannonball-like stones are found which cannot be properly classed with the smaller polished objects. The base of the hemisphere is flat, rarely slightly hollowed out, and varies from a circle to a decided ellipse, while the vertical section departs considerably from a true semicircle. Typical objects of this group are most plentiful in the middle Ohio valley. It is surmised that they served in playing some game, as talismans or charms, or for some special shamanistic purpose."

The collection of hematites at Andover, numbering all told 292 specimens, and set forth in the table on page 78, indicates the correctness of the observations made in this BULLETIN. The same is true of the collections made by Mr. A. E. Douglas for the American Museum of Natural History, New York. I visited the Peabody Museum, Harvard University, recently and found further confirmation of the general statement that the heart of the hematite belt is West Virginia, southern Ohio, northern Kentucky and Missouri and western Illinois.

The number of hematite objects in the Smithsonian cannot be ascertained, although it must be very considerable.

HEMATITES—ANDOVER COLLECTION

State	Celts				Axes		Plummets						Rubbing Stones	Paint Stones	Cones	Hemispheres	Balls	Bicaves	Ornaments	Nodules	Fragments	Unfinished, broken and unknown objects
	Oval	Beveled	Square	Grooved	Grooved	Unfinished	Slender	Not grooved	Grooved in center	Pear-Shaped grooved	Perforated	Peculiar										
Pennsylvania	2																				1	
Delaware	1																					
W. Virginia	7	3	7				1	2	3	1					3							4
Ohio	47	19	41	1	1		5	9	14	7		4		3	16	4	2	2	2	2	7	18
Indiana					2			1		2												1
Illinois								1														
Kentucky											1				2						1	
Iowa							1		1													
Arkansas													1									1
Missouri			4		17	2		2		1					2		1					1
Oklahoma								1														
Miss. Valley					1		1	2		1												2
Totals	57	22	52	1	21	2	8	18	18	12	1	4	1	3	23	4	3	2	2	2	9	27

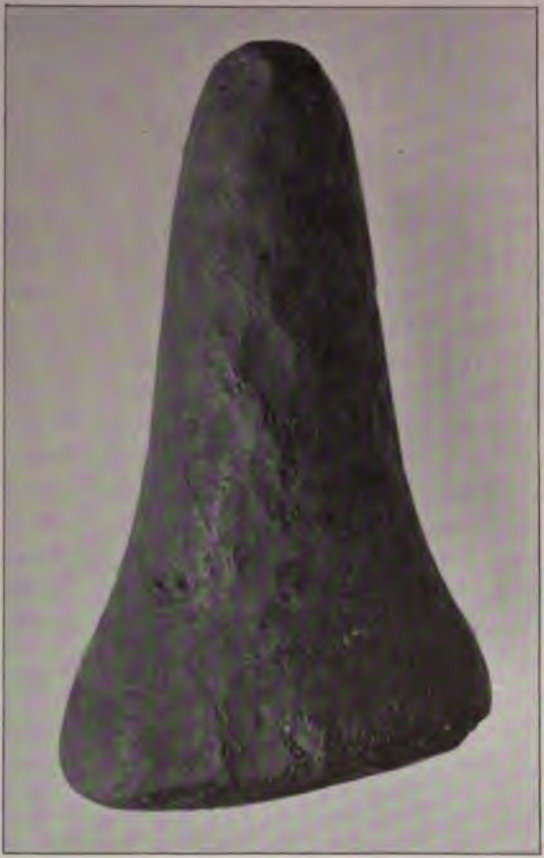

FIG. 40. S. about 4-5. H. M. WHELPLEY COLLECTION

Hematite bell pestle. Made of hard red "kidney" hematite, Floyd County, Indiana. This shows great age and much handling but does not indicate use as an ordinary pestle. In this collection are other specimens from Kentucky, Missouri and Ohio.

ORNAMENTS AND UNKNOWN FORMS

It is only natural that the material so highly prized by the natives as we suppose iron ore was, would be used for more than common purposes. There are found in Missouri, Illinois, portions of Kentucky and Ohio not a few ornaments, tablets, and other forms of this material. In the Douglas collection at New York, we have seen that there are 34 of these and in Doctor Whelpley's exhibit there are many more.

There are sufficient of these rare forms to constitute a type but so few of the winged objects have been found that it is not thought necessary to classify them.

The numbers in the Whelpley and Douglas collections might lead some persons to question the genuineness of some of these very unusual forms in hematite. But it must be borne in mind that these two large exhibits would naturally include unusual as well as common forms, and the proportion of unusual forms being similar in both exhibits, and each the property of a discriminating collector, it is safe to assume that all the specimens are beyond question genuine.

The tablets are of the ordinary flat perforated type following the slate, sand-stone and shale tablets in outline. There is nothing especially remarkable in the form, the chief difference lies in the fact that different and hard material is used.

Effigies are exceedingly rare and there are but one or two in existence. Fig. 47 presents a hematite carving, supposedly of a fish, from the Whelpley collection.

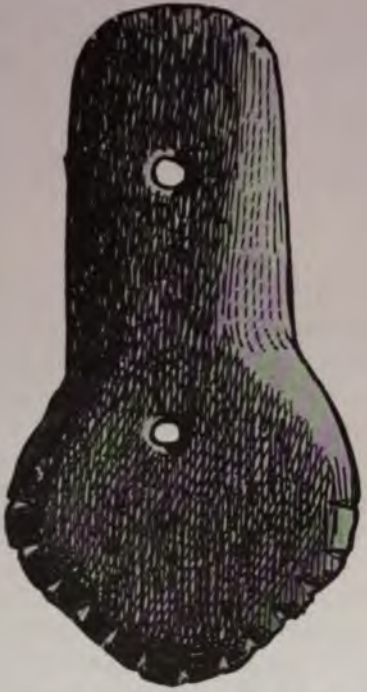

FIG. 41. S. 1-1. HEMATITE ORNAMENT. Andover Collection.

It is remarkable in that both ends are decorated with notches. On the upper end there are eleven notches or incised lines; on the lower or broad end there are fourteen lines. This specimen is not a type but an anomaly. It is of heavy, pure hematite and not of stone discolored by iron oxide as are many of the ornaments. It was extremely difficult to work because of the density and hardness of the material. Aside from these facts this form is peculiar. The edges are slightly beveled. The specimen shows unmistakable evidence of antiquity because of the patina, and the cuttings (striae) are irregular and have been made of flint and not with steel. Ross County, Ohio.

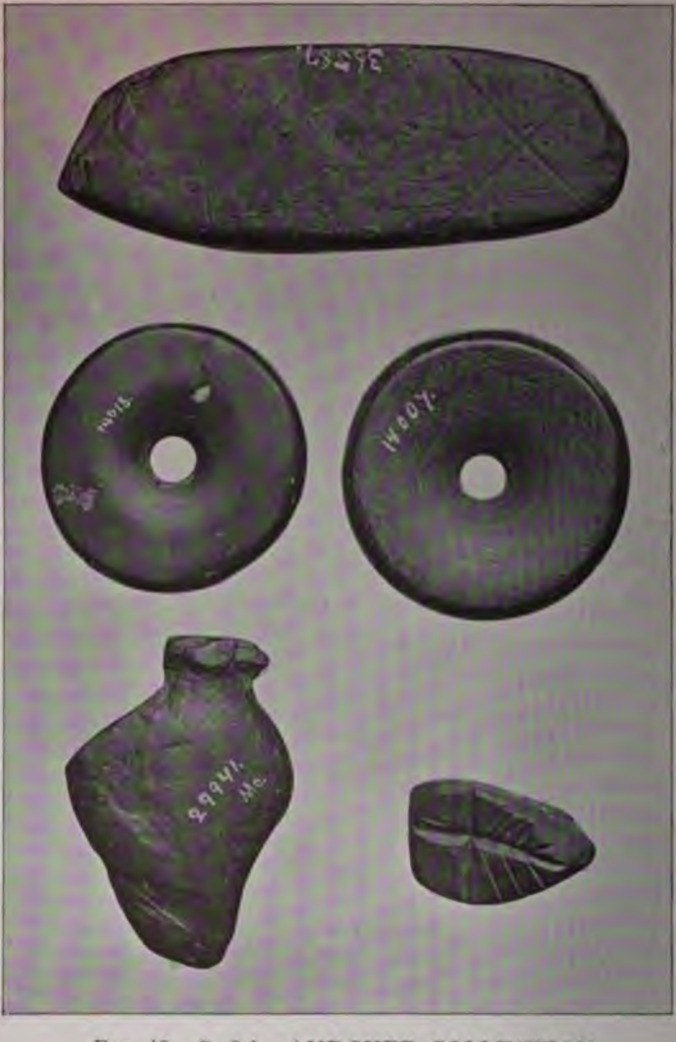

FIG. 42. S. 3-4. ANDOVER COLLECTION

Bicaves and decorated objects. Three from Ohio, one from West Virginia, one from Missouri. At the top is a long, unfinished ornament. No. 29941 may be an effigy.

DISCOIDALS OR BICAVES

These are found occasionally but not in sufficient numbers to be considered general. Yet the type is practically the same as the type in granite, quartzite or Tennessee marble common throughout the Middle-south.

If a discoidal of quartzite, granite or quartz was considered a work of stone-age art in the eyes of the aborigines, how precious must he have thought these bicaves of hematite to have been! And the same is true of the ornaments. If he, after much labor, was able to work out of the hard, black or dark red hematite an ornament, he might well be envied by all the other Indians of his particular tribe. It is just possible that these hematite ornaments and bicaves were not for use but rather a part of the sacred mysteries of the tribe. As to that we may never know. We may assume such to be true since objects requiring far less skill and labor in their manufacture are to this day regarded as mysteries among the various Pueblos of the Southwest. And it has often occurred to me that many of these problematical forms whether in slate or granite were of as great significance or value to stone-age man as are many of the charms and effigies among the Pueblos at the present time. But the difference is that we have the Pueblo with us and can construct their life easily, whereas in studying these stone-age people we depend on archaeological testimony alone.

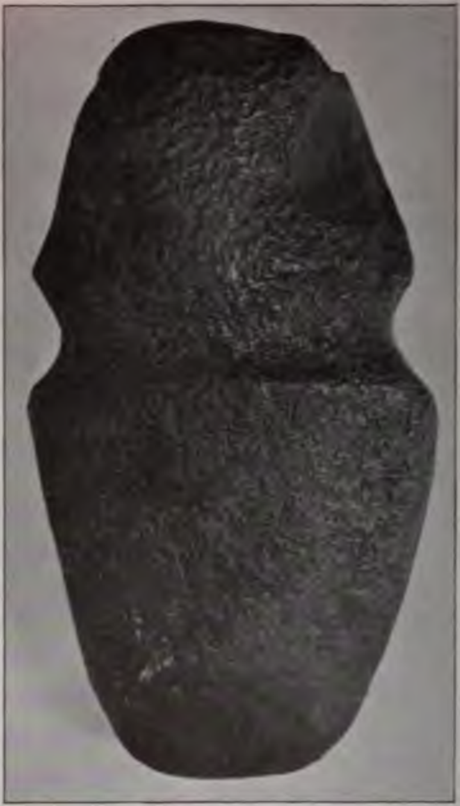

FIG. 43. S. 2-3. H. M. WHELPLEY COLLECTION

Rare hematite axe which seems to be double-bitted, with one blade unfinished; made of hard, black hematite. From Cole County, Missouri.

UNIQUE FORMS IN HEMATITE

Figure 37 illustrates four hematite discs from Missouri. Two in the upper row are not unlike the carefully chipped flint discs of Tennessee, described and illustrated in "The Stone Age in North America," pages 162-175. The purpose of these discs must remain problematical, but I would venture the opinion that they are not unfinished. They were made for some special purpose. What purpose, it is impossible to determine.

In Figure 39 are shown two objects of the roller pestle type and in Figure 40 a bell-shaped pestle. I do not believe pestles intended for ordinary, everyday use were made of this refractory material. Whether the three pestles illustrated were for grinding sacred meal or made use of in the ceremonies of the tribe in preparation of sacred food are questions we cannot answer. Theoretically, I am inclined to that opinion.

In Figure 42 there is shown a roughly shaped hematite effigy, museum number 29, 941. Also a bit of hematite decorated. The discoidals in the center of this figure are particularly fine.

In Figure 46 at the bottom of the illustration is a curious celt-like hematite of unusual form. I have seen very few hematites of this particular type. It appears to be much weathered and of concretionary formation. The same is true of the cone in the same figure. Objects of concretionary hematite are occasionally discovered.

Figure 50 presents a curious hematite hollow ball rattle perforated so that it can be suspended without danger of loss.

In Figure 51 there are a number of gorgets precisely similar to the gorgets in slate and shade. Number 8379 is peculiar in that the edges are serrated and notched.

The drilling in Fig. 52 is remarkable. We can readily conceive that the Indian was able to cut and polish hematite, but that he could drill it satisfactorily with his primitive drilling apparatus speaks very well for his ability as a worker in stone.

Mr. E. Ralston Goldsboro of Frederick, Md., owns a small hematite mortar from a site near the Lehigh river.

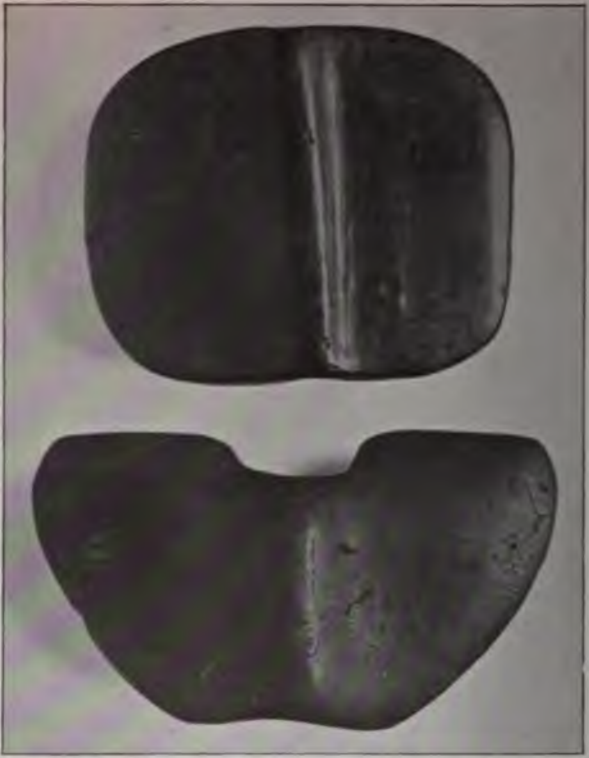

FIG. 44. S. 2-3. H. M. WHELPLEY COLLECTION

Rare hematite ceremonials. The upper one is brownish red. Found in Milton County, Georgia. The lower one is made of hard, black, concretionary hematite; from Franklin County, Missouri.

COMPARISON OF COPPER AND HEMATITE

Where the hematite occurs most frequently, the same peculiarity is observed as in Wisconsin and Michigan where great quantities of copper were either mined or found in the form of nuggets by the Indians. That is, hematite axes abound in certain sections of Missouri. Here there was in evidence much surface hematite, as Dr. Whelpley has stated. In the copper region of the Great Lakes quantities of copper gouges, fishhooks and other implements occur. In Ohio where much copper has been taken from the prehistoric mounds and in the South the gouges and the fishhooks are absent. So it is with the hematite. Wtih rare exceptions, axes of iron ore do not occur in Ohio and Kentucky. The material was considered too valuable to be made into objects of general utility. This is significant in the matter of hematites as in the case of the copper tools. The farther away from the source of supply, the more valuable the material. The same is also true of the great shells found along the Florida and South Carolina coast. These when brought into distant villages either become dippers or cups, shell ornaments, etc. Where they were exceedingly common along the coast, the natives made of them not only hoes but club heads and implements of general utility.

Thus we see that where material of a certain kind predominates it is used for a variety of purposes. One would not expect to find hammers or sledges made of hematite save where that ore occurred in almost inexhaustible quantities. Dr. Whelpley's mauls and sledges and similar objects are from Missouri.

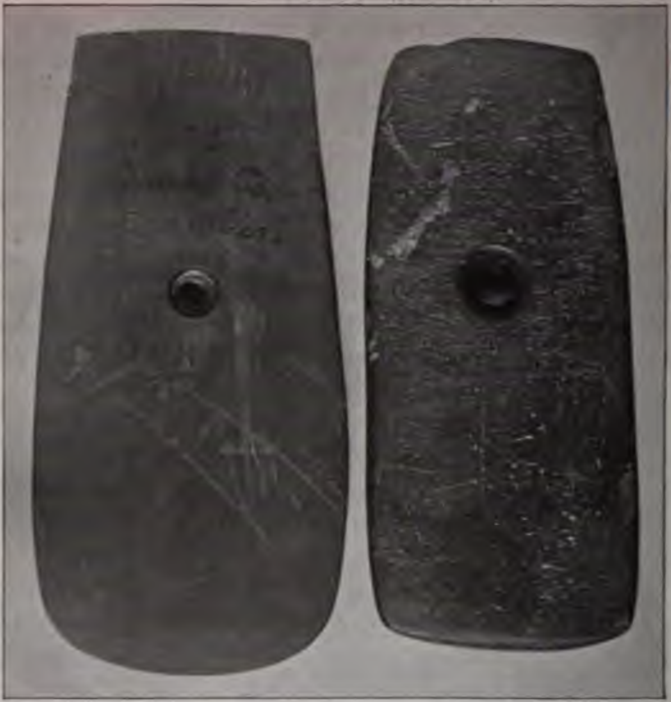

FIG. 45. S. 2-3. H. M. WHELPLEY COLLECTION

Rare hematite pendants of very hard reddish hematite. The one to the left is from Drake County, Ohio, the other from St. Francois County, Missouri.

CONCLUSIONS AS TO HEMATITES

It has never seemed to me that the prehistoric Indian regarded hematite in the same light as he did other stones. We must remember that he was a man of the stone age, knowing nothing of our present day culture. Things that would be cast aside by us or considered of no importance were precious to him, things that we considered ordinary were to him mysteries. We may assume that shortly after his arrival in America he found fragments of iron ore. He was accustomed to handling stone and he knew at once that this was no common material. It was different in color and it was heavier than other stones. It did not chip readily and when he tried to reduce it to desired shape by grinding he must needs work many and laborious hours. That he could chip hematite is evident, but he preferred the other process. Dr. Whelpley has many chipped hematites, but such are not general elsewhere in the United States. Yet when he had finished his work and had polished the celt, the axe, or the plummet, he found himself possessed of an implement or ornament of a mysterious material, material which must have appealed to those natives with whom he traded and who lived at a distance, as something above price. There is no stone like the hematite. It is susceptible of a high and beautiful polish. Its color, whether dark or light, is rich and beautiful. Truly it was a medicine or a mystery stone.

Regarding the hematites found with skeletons in mounds or graves, there are some significant facts to be observed. In poor or small mounds and stone heaps in the Ohio valley which I have explored I have frequently found rude flint implements, occasionally a fairly worked and polished slate gorget. This culture Prof. Mills gave the name of Fort Ancient culture to differentiate it from the Hopewell culture. The latter represents the finer arts of the more prosperous tribes living in the broad river valleys in Ohio. One never hears of the rude stone celt, the pestle, or the grooved stone axes being found with the burials in the mounds of the Hopewell culture. Why is hematite not found in the

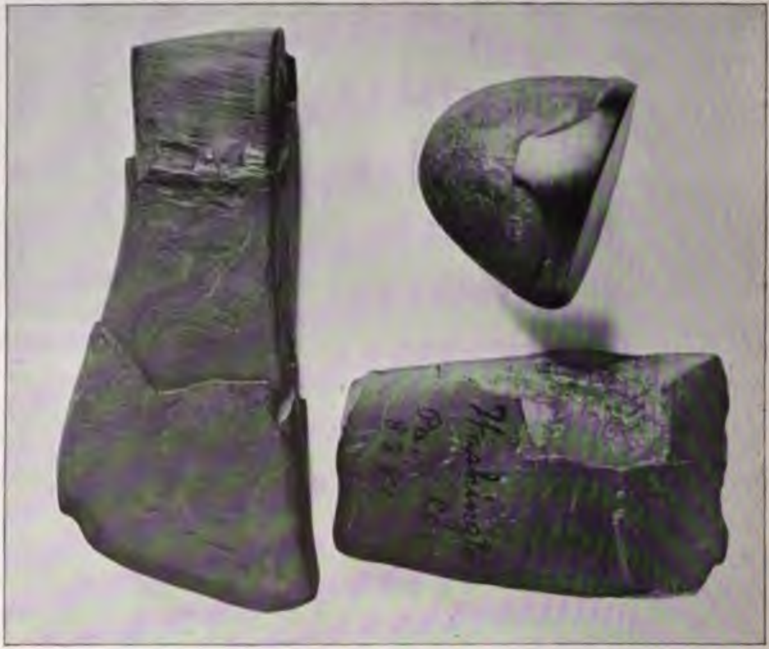

FIG. 46. S. 3-4. H. M. WHELPLEY COLLECTION

Hematite Indian artifacts showing chemical change in composition of either the outer surface or inner portion since they were manufactured. Note three grades of material in celt to the left. Surface of cone is the hardest kind of black hematite. The inner portion is medium hard brown iron ore. Numbers of weathered hematites are in this collection.

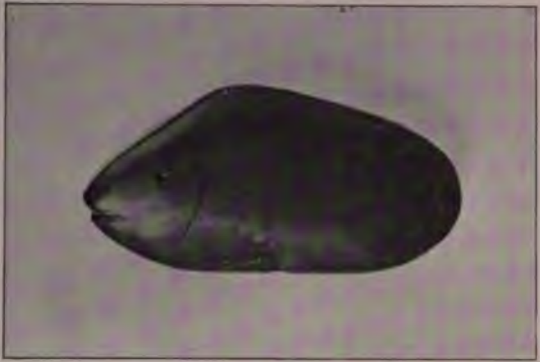

FIG. 47. S. 2-3 H. M. WHELPLEY COLLECTION

Hematite fish effigy, made of a very fine quality of hard black hematite. This object is difficult to explain. Only one side shows an eye and gill and both of these organs are due to depressions in the piece of crude hematite from which the celt-like object is made. Possibly a white man saw his opportunity and made the mouth. It is an interesting study. From Cole Camp, Betnon County, Missouri.

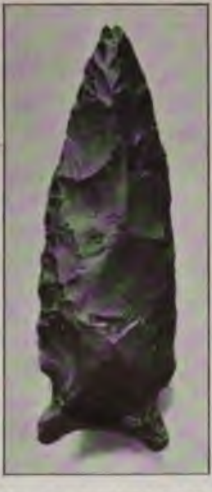

FIG. 48. S. 2-3. H. M. WHELPLEY COLLECTION

Hematite spear made from hard black hematite. The side shown is not as well chipped as the other side. The specimen shows much handling. Found in San Luis Obispo County, California. Doctor Whelpley has other hematite spears but only one of hard black hematite.

altar of "high-culture group" mounds? Possibly the Mound-building peoples did not make it into plummets or celts. Certainly, the Hopewell culture people were skilled artisans in the working of quartz crystals, copper and occasionally meteoric iron fragments. Therefore, the hardness of hematite did not present an unsurmountable obstacle to the lithologist.

In my book, "Primitive Man in Ohio," published 1892, I have referred in detail to many explorations. If readers will consult the references cited on the next page in this BULLETIN, they will observe that hematites have been found either in small mounds in valleys or in the hill mounds. And these mounds do not appear to be of the Hopewell culture. But during the exploration of the Hopewell site, we found no hematite, if my memory serves me correctly. And this site, as has been frequently stated, evinced the highest culture of and prehistoric people north of Mexico, with the possible exception of the Chaco Group of ruined pueblos in New Mexico.

It would seem to me, after due study and consideration, that the hematites were in use previous to the occupation of the great mound groups of the Ohio valley. In other words, that they are not of the Hopewell culture, but earlier. In this statement I may be in error, but up to the present all the facts indicate the truth of such an observation.

Squier and Davis' observations as to hematite plummets in the altar mounds (see page 47) bear out my contentions.

Some hematites have been found in the gravel or glacial kame burials. I have alluded elsewhere to these peculiar burials found in gravel knolls throughout Ohio and Indiana and have considered them somewhat different from either the Hopewell or Fort Ancient culture.* Such hematites as have been reported to me, or found by me, or regarding which I have read in reports as coming from these gravel knolls are for the most part the celts. They seem, possibly, older than the hematites from the mounds.

Both Mr. Braun and Dr. Whelpley, living as they do in the very heart of the hematite belt, in the United States, have special advantages or opportunities for observation. Therefore,

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*The Putnam Anniversary Volume. Boston, 1909, p. 142.

I have accepted their statements fully. Their observations indicated precisely what a study of the museum collections leads one to believe. That is, the wide distribution of the celt, which undoubtedly is the most common implement of iron ore in the United States. The celt may have occurred to the aborigine who was seeking after paint and who in rubbing a fairly soft bit of hematite produced an edge and found that the edged tool was quite as convenient and certainly would last longer than the ordinary stone celt.

The plummet and the cone, while widely distributed, cover no such area as the celt. The bits of hematite used as paint or rubbing stones are quite as widely distributed as the celt. The axes are confined to a narrow belt in Missouri with here and there exceptions in Illinois, Kentucky or Ohio. The ornaments predominate in the region within 150 miles of St. Louis. The few arrow points or spear-heads made of hematite might be considered either as freaks or as implements made for some particular shamanistic purpose. The tablets and the winged objects are confined to a restricted area. A complete tabulation of all the hematites in both public and private collections in the United States might add to our knowledge of these interesting things and peculiar examples of prehistoric art.

P. 23, Chapter 3. Hematite spherical object with decayed skeleton. Mound in Muskingum valley, near Marietta.

P. 25, Chapter 3. A worked hematite object similar to a cylinder, was found in a hill mound near the mouth of the Muskingum river, Ohio, previous to 1890. Three skeletons were taken from this tumulus.

P. 27, Chapter 3. "It is very singular that hematite should have been used so largely by the aborigines of the Muskingum valley for fashioning implements, when tribes of the Miami or Scioto regions used it only to a limited extent. Mr. Davis reports finding a highly polished hematite celt and cone and fragments of hematite in a tumulus upon the same terrace as the altar mound."

P. 148, Chapter 12. Mound No. 36, three miles from Chillicothe, Ross County, on the east side of the Scioto — a hematite celt with skeleton.

P. 161, Chapter 13. Mound near Slate Mills, Ross County,— a fine hematite cone near the left hand of a skeleton.

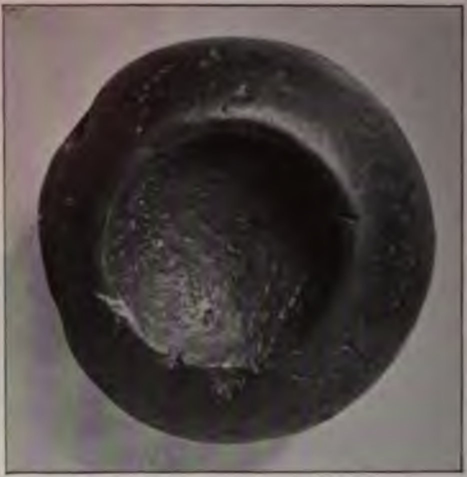

FIG. 49. S. 2-3. H. M. WHELPLEY COLLECTION

Black hematite discoidal. Doctor Whelpley has a more highly polished bicave than this one, but because of the exceedingly glossy surface, no satisfactory photographs can be taken.

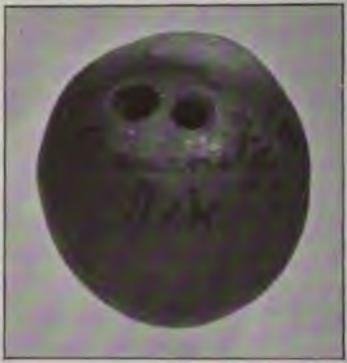

FIG. 50. S. 7-8. H. M. WHELPLEY COLLECTION

Hematite rattle, extremely rare. Made from a very hard black hollow hematite nodule. This contains hematite pieces evidently introduced through the holes but of such shapes that they do not readily fall out. The shell is about .20 inch thick, showing evidence of long use. From Ouachita County, Arkansas.

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Handbook of American Indians, p. 542.

Hematite quarry, P. 864.

Holmes, W. H.

Smithsonian Report, 1903, p. 723.
Description of a Hematite Quarry.

Mills, W. C.

Has referred to hematite objects in several of his reports. Ohio State Arch. and Hist. Society, 1899-1911.

Moore, Clarence B.

Has found very few hematites in his explorations. Very few references to them in his reports.

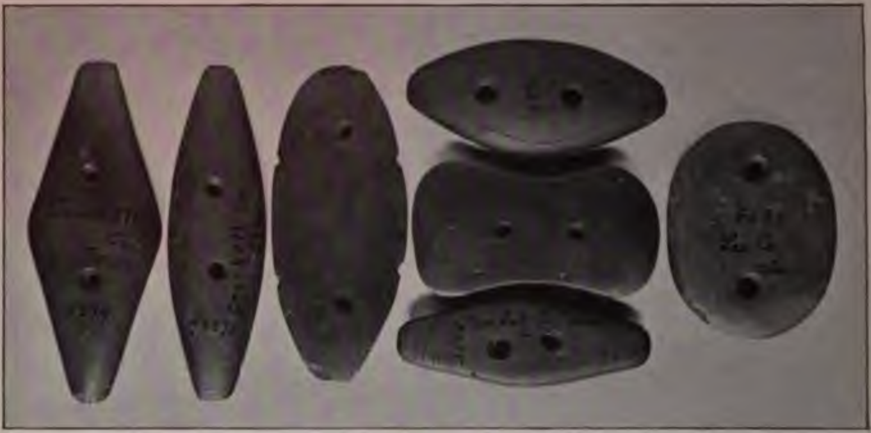

Fig. 51. S. about 1-3. H. M. WHELPLEY COLLECTION

Hematite gorgets. Rare. These are of very hard black or hard red hematite. Those not labeled are from Missouri. Doctor Whelpley states: "I have several broken hematite gorgets. They are nearly all from Missouri and Illinois. I know of two very hard black hematite gorgets, found in Illinois."

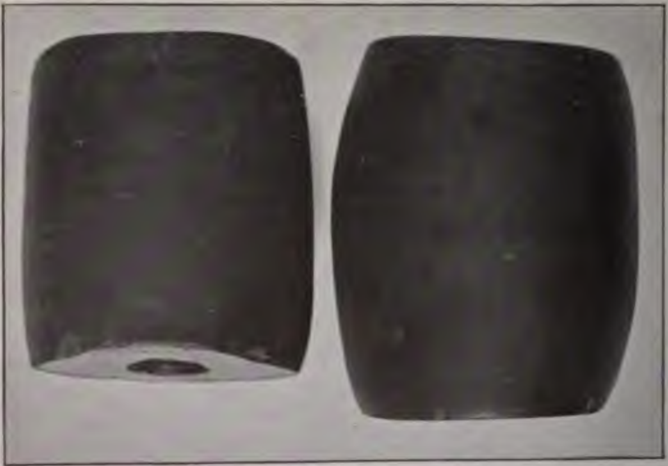

Fig. 52. S. 4-5. H. M. WHELPLEY COLLECTION

Very hard reddish brown hematite beads. Both show much handling and the one to the left appears to be of great age.

Moorehead, W. K.
"Primitive Man in Ohio," 1892. Chapters 3, 12, 13.
"Prehistoric Implements," 1900, pp. 128, 132-5, 182, 337, H. celts, ornaments, cones, plummets, paint stone.
"The Stone Age in North America," 1910. Vol. II, pp. 295-307. H. objects.
Ohio Arch. and Hist. Pub., Vol. V, p. 236, H. objects.

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"Ancient Monuments of the Mississippi Valley," 1848, p. 215.

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"Antiquities of Tennessee," 1897, pp. 289-90, H. cones and objects.

Whelpley, Dr. H. M.
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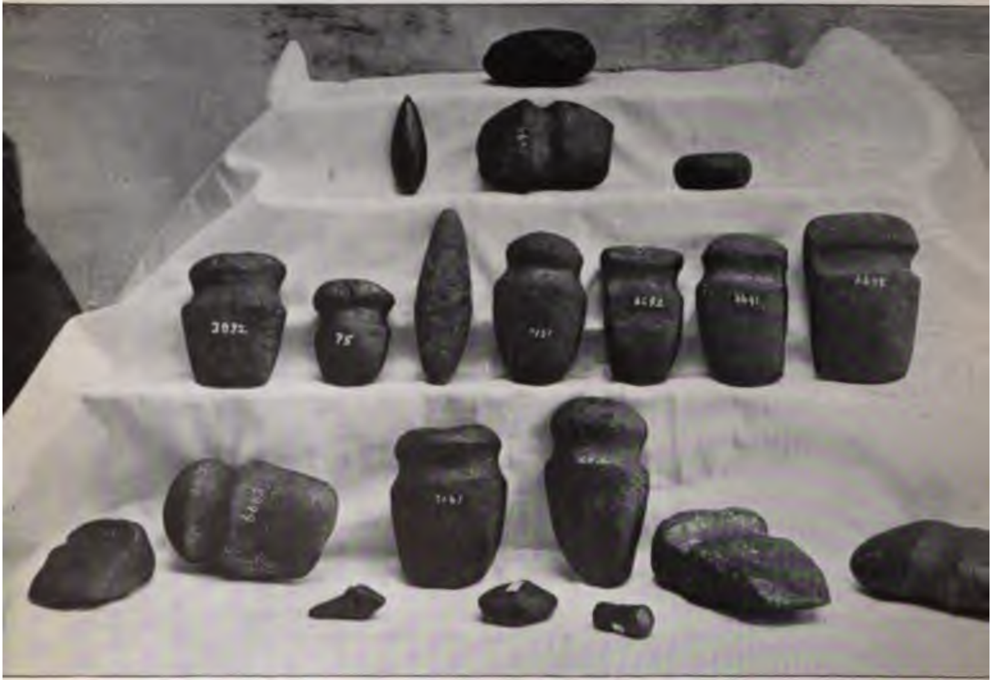

FIG. 53. S. about 1-5

Group of hematite objects from the collection of Dr. W. C. Barnard, Seneca, Mo.

Top row; black, oval club head.

Next row: double grooved, highly polished plummet, an axe grooved three-fourths of the way around, back flat; discoidal, also slightly grooved around the circumference.

Central row; six fine, grooved axes and a large ungrooved plummet-shaped object.

Lower row; grooved axe, two perforated winged objects and a small paint pestle or muller.

Nearly all of the specimens are from St. Charles, Montgomery, Lincoln and Callaway Counties, Missouri.

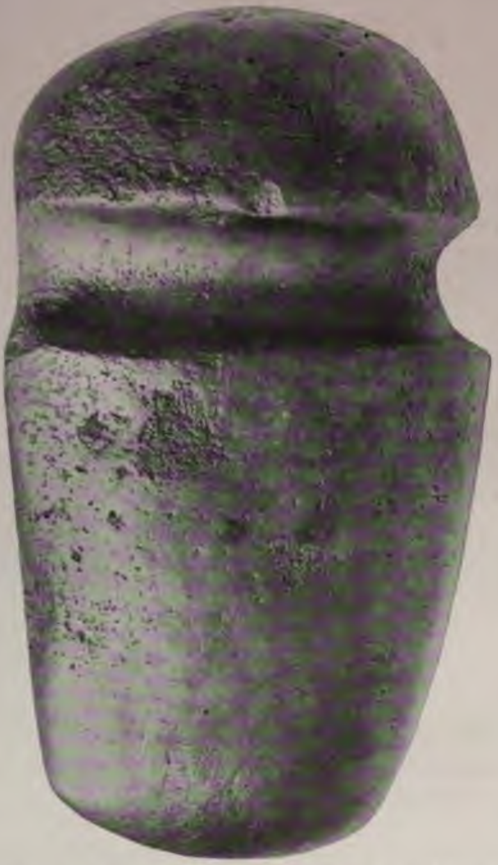

FIG. 54. S. 1-2. H M. WHELPLEY COLLECTION

Highly polished grooved hematite axe. A fine specimen of perfection in workmanship. Weight, 12 pounds.

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